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THE AUTOMOBILE

Quaker City Third Annual Roadability Run

With the well-ordered precision of accurate machinery the Quaker City Motor Club conducted its third annual roadability run Saturday, from Philadelphia to Atlantic City, a distance of about 68 miles.

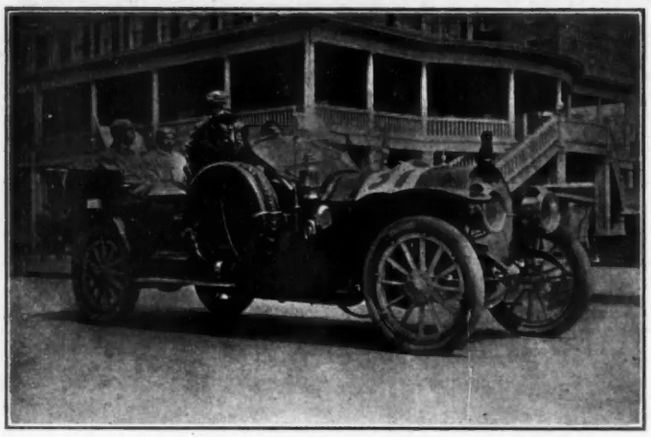
Scene at the Start, in Front of the Hotel Walton, Philadelphia
Where the Cars Finished in Front of the Strand, Atlantic City.
Above, at the Start, City Hall Beyond. Below, President Berger's Car

There was a snap and exactness about all the preliminaries and a certainty and vim in the run itself that savored of scrupulous care on the part of the officials.

It was a delightful affair, well handled, in which the maximum of pleasure and the minimum of discomfort were experienced. Under the conditions, speed was at a discount, the cup-winning cars being those that most closely approximated a secret time fixed in advance by Mayors John E. Reyburn, of Philadelphia, and Franklin P. Stoy, of Atlantic City.

This time was within the New Jersey speed limit and was decided upon by a unique process. Mayor Reyburn selected 3 hours 33 minutes as his time and Mayor Stoy fixed upon 3 hours 39 minutes and 19 seconds. These two times were added together and divided by two, the result being 3 hours 36 minutes and 9 1-2 seconds. The distance was approximately 68.2 miles, thus the running time required of the winner was only moderate, considering the magnificent highways included in the entire course.

The winners of the main prizes—for there were many, every finisher being awarded one—were all bunched within a short distance. It was merely a matter of guessing, as far as the operators of the cars were concerned, as any one of fifty entrants could have crossed the line at the exact moment of the secret time, if that moment had been known. As it was, scores of cars after completing the run were laid up alongside the curb on the near side of the finishing line while the owners waited until they thought the proper second had arrived to check in.



Winning Alco, Bitner Driving, at Atlantic City

In this regard a number of funny incidents occurred. One in particular resulted in woe for William J. Coghlan and his Chadwick car. Mr. Coghlan reached the finishing line at the Hotel Strand in 3 hours 36 minutes and 5 seconds. He could have gone on and checked in, but he had estimated the time at a little over 3.40 and he waited before taking the count.

The winner of the first prize turned up in the Alco entered by W. C. Longstretch. His time was 3.36.05, just 4 1-2 seconds less than the secret time.

Charles J. Swain's Winton was second, 2 3-5 seconds faster. B. F. Richardson's Mitchell and H. A. Rosenheim's Cadillac were tied for the third and fourth cups at 3.35.30, and F. J. Fanning's Thomas Flyer was fifth.

After the cup winners had been determined, the tedious job of awarding the approximation prizes was taken up. Every car that finished received some sort of an award and consequently much care was required in fixing the status of each entrant.

The twenty contestants that finished either just before or just after the cup winners were given humidors or fine clocks and each succeeding score of cars were given prizes of lesser value. The last car in was given a souvenir trophy of beauty and value.

Special factory prizes were awarded to the Stearns, Winton and Buick companies for the most numerous entries, classified on a basis of valuation. Each had five cars entered in the race.

There were 103 cars, including two electrics, entered for the run and of these eight did not start for one reason or another. All the rest finished except four. There were no accidents en route and the general comment after the finish was that the event was the most successful road run ever attempted under similar conditions.

Long before the hour designated for the start in front of the Hotel Walton the entered machines began to assemble. Philadelphia's most perfect downtown street was brilliant with bunting and color and life as the automobiles scurried about to find their stations.

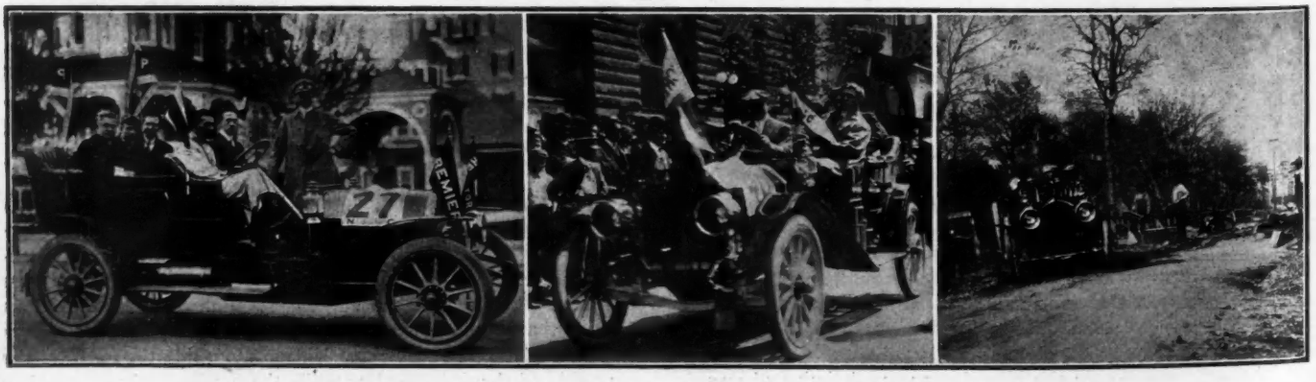
These had all been marked off and numbered, and by noon Broad street was lined on both sides with panting motors. It seemed impossible to carry out the starting program without confusion of some sort, so great was the assemblage and so unwieldy seemed the mass of entries.

Two platoons of giant policemen in their best raiment had been assigned to preserve order, but they had little to do save to lend color to the beautiful picture and to give official character to the event by their presence.

In front of the Hotel Walton a specially synchronized clock, regulated from Washington, was the official timepiece. At the Hotel Strand, Atlantic City, the counterpart of the Philadelphia clock marked the seconds in unison with it. Exactly at 1 o'clock the word was given and car No. 1, Charles J. Swain's new Win-

TABLE OF PRIZE WINNERS AND SCORES MADE

No.	Car.	Driver.	Time Penalty.	Class. Prizes.
31	Alco	A. H. Bitner	0.00.04½	Grand
61	Winton	C. J. Swain	0.00.13 1-10	Second
66	Mitchell	A. E. Wright	0.00.39½	No. 58 won toss
58	Cadillac	H. A. Rosenheim	0.00.39½	Fifth
77	Thomas Flyer	F. J. Fanning	0.00.50½	
51	Elmore	G. R. Harvey	0.00.55½	
82	Oldsmobile	E. R. Rusk	0.01.09½	
24	Oldsmobile	E. K. Schultz	0.01.14½	
8	Stearns	G. H. Gantert	0.01.23 9-10	
22	White	Evans Church	0.01.39½	
42	Halliday	A. Krouse	0.01.39½	
5	Warren-Detroit	Tom Berger	0.01.50½	
10	Elmore	F. Hardart, Jr	0.01.51½	
17	Stearns	F. C. Dunlap	0.02.09½	
30	Mitchell	Thos. B. Smith	0.02.20½	A Class. Prizes
35	Buick	E. H. Lewis	0.02.36 1-6	
25	Buick	F. K. Worley	0.02.39½	
9	Oldsmobile	A. E. Adams	0.03.09½	
26	Oldsmobile	R. E. Ross	0.03.20½	
92	Dragon	J. Jacobs	0.03.30½	
15	Buick	Mrs. E. Wilkie	0.03.39½	
6	Woods Electric	Geo. W. Daley	0.03.50½	
73	Winton	Geo. E. Potts	0.03.54 1-10	
68	Chadwick	W. J. Coughlin	0.04.20½	
96	Rustler	R. C. Russell	0.04.39½	
38	Pierce-Arrow	Louis Lukes	0.04.39½	
99	Buick	Tom Wilkie	0.05.09½	
14	Buick	Ed. Wilkie	0.05.09½	
79	Studebaker	F. A. Friend	0.05.09½	
101	Empire	W. Fulton	0.05.20½	
32	Locomobile	Frank Shaw	0.05.39½	
41	Peerless	Paul B. Huyette	0.05.41½	
84	Packard	W. C. Chambers	0.06.20½	
11	Packard	Otto C. Fell	0.06.50½	
21	Locomobile	Howard McTurk	0.07.09½	B Class Prizes
39	Chalmers	E. B. Morgan	0.07.50½	
64	Palmer-Singer	C. U. Palmer	0.08.39½	
54	Kline-Kar	P. E. Swartley	0.08.39½	
4	Packard	P. D. Folwell	0.08.50½	
100	Rochet-Schneider	J. Brown	0.09.20½	
83	Marmon	J. A. Hudson	0.09.20½	
40	Warren-Detroit	Chas. Rudd	0.09.24½	
52	Stearns	J. F. Brown	0.09.39½	
62	Stoddard-Dayton	G. S. Smith	0.10.25½	
46	Peerless	S. A. Steltz	0.10.39½	



Premier Entry at Atlantic City, Secretary's Car, and Packard Near Egg Harbor

ton, crossed the line and sped along toward Market street, through a lane of interested spectators.

As Mr. Swain passed the timers he was handed a card bearing the time of his official start. Half a minute later, car No. 2, a White, entered by A. T. James, moved over the line and followed the leader. Down through the whole list this was continued. In a few cases the cars were not sent away on their official time, but wherever this occurred the official time was taken and in the final reckoning it was used as the basis upon which the time of the car was determined.

There was no attempt made at speed in the run to the ferry, because of the crowded condition of Market street, and the cars trundled aboard the big boats without special incident.

The day was all that the most enthusiastic automobile owner could have desired. The sun was warm and bright, dispelling the clouds of morning, and the rain of previous days had laid the dust so that ideal touring conditions were enjoyed. The roads through Jersey could hardly have been in better shape for the event and in the bright sunlight the procession of gaily decked automobiles, carrying laughing loads of passengers, added an element of life and power and energy to the scene that was wonderfully effective.

Woods Electric, Which Acquitted Itself With Credit

The route lay through Camden to Collingswood, Haddon Heights, Summerdale, Laurel Springs, Berlin, Waterford, Hammonton, Elkwood, Egg Harbor, May's Landing, Pleasantville to Atlantic City, a matter of 68.2 miles.

Conditions were excellent for speeding, but under the conditions framed by Secretary Harry C. Harbach and the contest committee, under R. E. Ross, speeding was useless and as a result the run developed into a nice, easy, genteel affair without mishaps and full of pleasure to participants.

These plans demonstrated their own wisdom more than once during the run.

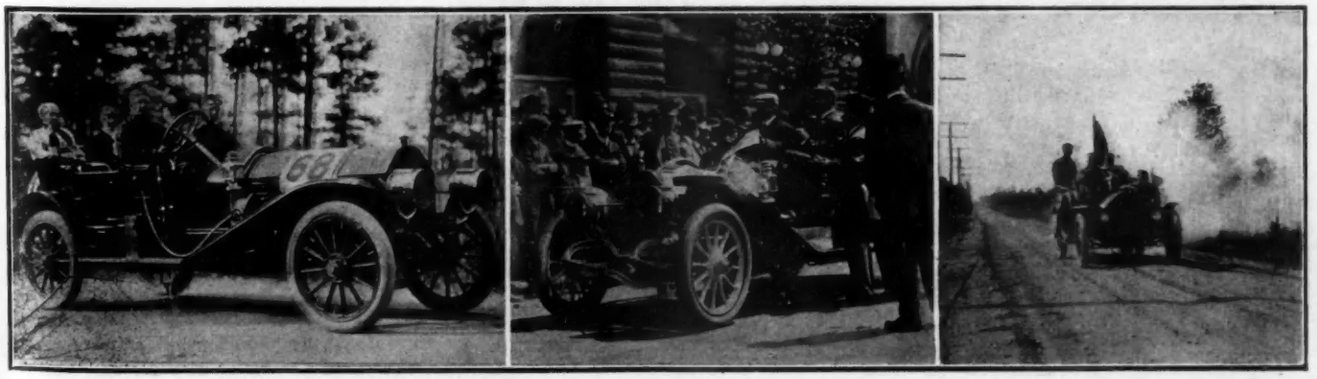
The well-guarded "secret time" added just the element of uncertainty that was necessary to give everybody a good time.

The citizens of New Jersey exhibited intense interest in the affair. At every city, town, hamlet and cross roads, groups gathered and watched the flight of the cars. In most of these groups some person had a copy of the official booklet of the Quaker City Motor Club, containing the list of entrants, and as each car sped by heads would converge over the pages and when the car had been identified welcoming shouts and comments upon its position and speed greeted the ears of the tourists.

Approaching Atlantic City the participants got their first taste of salt air, for a cooling breeze from the ocean swept the great boulevard which swings out toward the point upon which the city is located. An express train moving at high speed toward Atlantic City gave the automobilists a passing temptation to show their best paces along this part of the route, but the participants did not take advantage of the opportunity afforded except in a few cases.

TABLE OF PRIZE WINNERS AND SCORES MADE

No.	Car.	Driver.	Time Penalty.	Class. Prizes.
45	Marion	W. McCullough	0.10.39½	
87	Winton	J. L. Brock	0.10.50½	
36	Apperson	A. M. Benson	0.11.09½	
90	Stearns	A. E. Margerison	0.11.20½	
85	Autocar	F. Browning	0.11.39½	
91	Brush	W. J. Aitken	0.11.50½	
95	Kline-Kar	J. F. Kline	0.12.09½	
74	Franklin	Geo. Karlavan	0.12.39½	
7	C-G-V	C. Edgar Shreve	0.12.50½	
63	Palmer-Singer	E. M. Haines	0.12.50½	C Class Prizes
55	Pullman	C. A. Adee	0.13.09½	
44	Stoddard-Dayton	W. W. Randall	0.13.39½	
49	Speedwell	H. L. McCullough	0.14.09½	
18	Winton	A. E. Maltby	0.14.51½	
60	Warren-Detroit	J. R. Doolittle	0.15.20½	
86	Locomobile	John Scanlin	0.15.39½	
80	American Traveler	J. E. Mountain	0.15.39½	
67	Buick	H. O. Krause	0.15.59½	
89	Stearns	H. A. McNichol	0.17.39½	
69	White	T. H. Smart	0.18.20½	
72	Detroit Electric	R. L. Eberling	0.19.30½	
88	Stearns	Frank McNichol	0.19.39½	
70	Buick	J. A. Wiggons	0.20.09½	
71	White	E. B. Stone	0.20.39½	
12	Winton	John Hohtenadel	0.23.09½	
97	Inter-State	M. Wertheimer	0.26.12½	
34	Cadillac	T. F. Seifert	0.27.20½	
33	Peerless	I. M. Koch	0.28.20½	
94	Cottin-Desgouttes	G. H. Hinckle	0.28.50½	
61	Regal	T. M. Turning	0.31.50½	D Class Prizes
76	Mercer	W. Oliver, Jr.	0.33.39½	
93	Pennsylvania	A. Barnes	0.34.50½	
75	Chalmers	H. Ringler	0.35.09½	
20	Franklin	J. A. Paul	0.50.50½	
27	Premier	J. La Roche	0.50.52½	
2	White	A. T. James	0.51.39½	
47	Matheson	W. T. Taylor	0.51.50½	
19	Palmer-Singer	W. A. Miller	0.52.50½	
50	Packard	H. M. Lyman	1.31.20½	
104	Warren-Detroit	F. J. Titus	1.40.50½	
65	Palmer-Singer	L. E. French	1.57.50½	E Class Prizes
53	Kline-Kar	J. Mann	1.33.20½	
3	Jackson	I. L. Brown	Did not fin.	
98	Premier	W. G. Dyer	Did not fin.	
102	Stod.-Day. Wagon	W. Jackson	Non-contestant	



Big Six Chadwick, Locomobile at the Start, and Regal Plugger at Speed

Many of them arrived too soon, according to their idea of the "secret time," and for more than an hour the seaside resort was a riot of colorful cars that paced here and there awaiting the moment fixed by their owners to check in. As has been stated, some of these made fatal mistakes, but, on the other hand, the winners guessed right.

From the right side of the yard of the Hotel Strand a runway extends to the avenue, and when a car checked in it was run up this path, circled the yard and crossed the official line in front of the timer's stand in the porte cochere at the entrance to the hotel veranda.

As each car passed this line, the entrant handed in his signed timing card and the timers, under the direction of President Paul B. Huyette, of the Philadelphia Timers' and Scorers' Club, announced the second of the finish. This was noted upon the cards and the conditions were so well known by both officials and entrants that no chance for protest was given.

White Car in Q. C. M. C. Run Making Time

Pathfinder Crossing White River on Flat Bottomed Ferry Boat

Chalmers Pathfinder Near Little Rock, Showing Convicts at Work

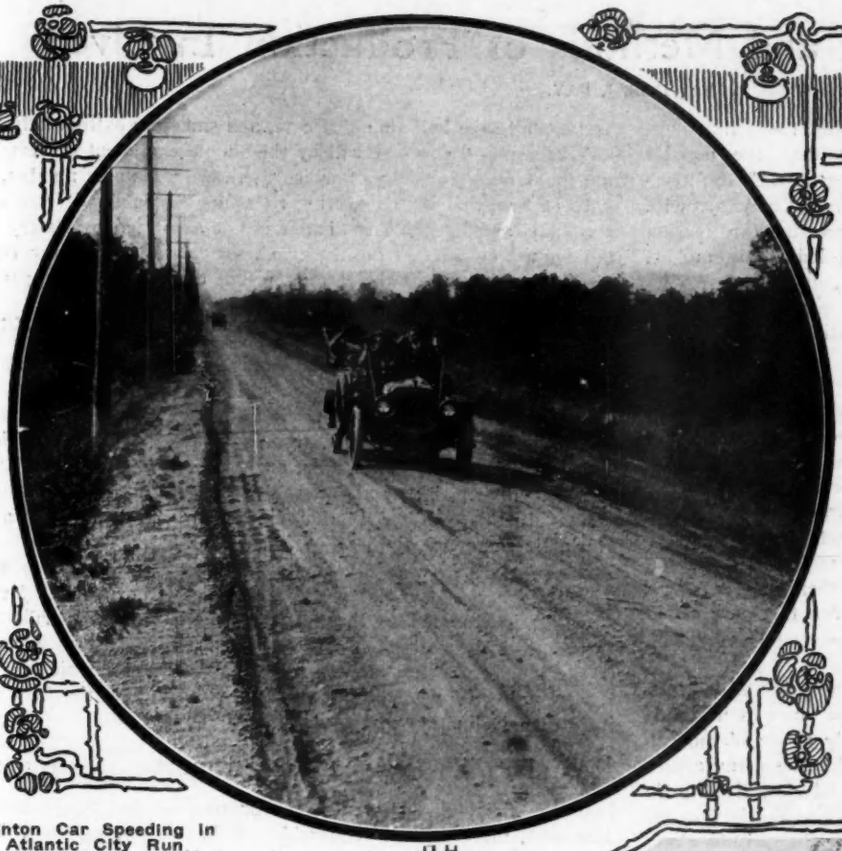
Glidden

Swinging northward at a rapid gait, the progress of the 1910 Glidden Pathfinder has been more than satisfactory during the past week. Road conditions have been superb. The weather one day was so hot that Driver Gardham was almost prostrated and was obliged to lay up for a full day's rest.

From Fort Worth to Oklahoma City the course lay over excellent going and northward from that place, the prairie roads extending into the foothills of the Wichita mountains, proved a treat to the explorers. At Lawton and Enid, and in fact, wherever there was a village along the route, enthusiastic welcome was extended.

It has been practically decided to make Wichita a Sunday stop of the tour. This conclusion was reached when it was found that Kansas City would prove too far to make by Sunday, as scheduled, if other points further South were to be covered.

MARTIN'S RANCH, TEXAS, Apr. 29—The pathfinder crossed from the South into the West proper in its run from Dallas to Fort Worth Wednesday. Dallas has few marks of the cattle country about it, but Fort Worth proudly terms itself the "cultured cow town." The road hunters were entertained by the dealers' club of Fort Worth, and the *Star Telegram* and *Record* at a dinner in the Worth hotel, and found that men who have risen to fortune from



Winton Car Speeding in Atlantic City Run

The timers were equipped with a list of entrants in tabular form, containing the starting time of each car and as the announcement of the finish was made the time was noted opposite the car's number and in a few seconds the actual time of the contestant was figured out.

After all the cars were in, the cards and the tabulation were taken to one of the committee rooms of the hotel and in a very short time the result was ascertained.

Mayor Franklin P. Stoy and the contest committee had been called into session during the time this clerical work was being done and had given out the official figures of the time upon which the awards were to be based. Having determined the precise second, by averaging up Mayor Reyburn's time with that of the Atlantic City Mayor's, the timers selected the cars that had come close to the mark and within a little more than two hours after the last car was checked in the result was announced.

(*Continued on page 860.*)

Pathfinder

a cow puncher's saddle are now putting the same enthusiasm into motoring that they did into broncho breaking a decade or so ago.

Mayor William Davis, Col. Louis J. Wortham, general manager of the *Star Telegram*, Col. E. E Crowley, former secretary of the Cattle Raisers' Association of America and now president of the Dallas Dealers' Association, were all educated in the rough life of the plains and are all deeply interested in the development of motoring in this part of the country. Fort Worth has a population of 65,000 and 700 cars, mostly of the higher priced makes, are owned there. A million and a half was spent for motor cars in 1909.

The pathfinding car left Fort Worth Thursday following a pilot and spent Thursday night at Martin's Ranch, 29 miles north. Oklahoma City, via Terral, is the route for the next day's run.

Decatur, a town of 2,000, seat of Wise county, is the most important place between Fort Worth and Terral.

Pilots will escort the pathfinder into Oklahoma City. The roads through the stock country are, to a large degree, excellent, being of the resilient prairie type or macadam pike with exception of small stretches of cobble stone which would not total a mile between Fort Worth and Martin's Ranch.

Crossing Bridge Over Salene River, Out of Denton, Ark.
Pathfinder Met by Escort, Just Before Crossing White River

Owen Automobile and Methods of Production Involved

By THOS. J. FAY.

LATELY it has been the idea, considering the general situation, to advance along lines involving the popular conception and selling prices which agree with the average pocketbook. When the Owen Automobile Company, with its new plant at Detroit, Mich., decided to brave the 1910 market with a new-model, relatively high-priced, full-fledged automobile, the project took on divers important phases, and there was no gainsaying the fact that the quality of the car would have to be in full keeping with the financial situation, or the whole project would fall to the ground.

It will not be the purpose at this time to discuss car details, but the type of car and its main features will be found in the specifications given with this article. In order to show something of the extent to which the company has made preparation to build a pretentious automobile, an excursion will be made camera-wise through the plant, without forgetting that there should be a certain harmony of the manufacturing plan in the main; even so, close attention will be given to methods at random, rather than to follow out a systematic plan, it being the case that even were space available for a complete exposé, the story would become too heavy, and the great main situation would be lost in a mass of detail.

While the plant is less than half of the size which will obtain within a short time, the fact remains that the plant as it stands to-day is equipped throughout with absolutely new and modern machinery which was purchased especially for the manufacture of the new Owen car, so that the extensions which will be made when the new buildings are ready, will be of no especial interest from the point of view of this discussion, since they will be along the same lines, and will have interest in that the capacity of the plant will be increased, but the quality of the product will be that as reflected by the machinery equipment as it obtains at the present time.

Norton Milling Machine on Drilling Work

In a shop of this character devoted exclusively to the production of parts for automobiles of the highest character, large substantial and well-equipped universal milling machines serve an extremely important purpose. A of plate 1 shows a Hendy Norton Milling Machine, which, for the moment, is being used in a drilling operation, and the drill D1 is drilling a hole in the yoke Y1, which is blocked up on the platen P1.

Motors Are Assembled on Special Tilting Stands

In the assembling department, the idea of being able to get at every portion of the motor during the process of assembly counts in the long run, not only by way of saving time, but in the direction of quality of the finished product. B, plate 1, shows a cast frame F1 with sectors S1 and S2, which in turn support the motor arms A1, A2 at one end, and similar arms at the other end of the motor. By the means afforded, the motor is tilted so that the operator is enabled to examine the bottom B1 of the crankcase with the same facility that is afforded in the examination of the cylinders C1 when the motor is setting in the vertical plane. The motor, as it is shown in this example, is with the front end facing and the half-time gear train with the driving pinion P1, intermediate pinion P2 and camshaft gear P3 exposed to view, the cover of the half-time gearcase having been removed for the purpose. One pair of cylinders is mounted into place and the valve springs which are concentric with the valve stems are shown with a protecting cover C2 over them, there being one cover for each valve; this is a special feature used on this design of motor for the purpose of excluding dust or other foreign substances, and in order to assure a further degree of silence in the operation of the motor. One of the pistons P4 shows above the half-time gearcase, and since the bottom half B1 may be dropped down at will by the simple expedient of removing the holding bolts B2, of which there are a suitable number, it is to be seen that the connecting rods may be unbolted from the crankpins and let down so that it is not absolutely necessary to remove the cylinders from the crankcase in the process involved in the examination of the pistons, piston rings, or relating parts.

Gang Drill Utilized in Progressive Operations

When a gang drill is taken advantage of in connection with a series of jigging fixtures, one or more men may undertake to complete a given character of work, and speed as well as accuracy is thereby induced. C, plate 1, presents just such a drill, in which the spindles, S1, S2, S3, and S4, are mounted in the same plane, but the drills which they accommodate are not all within the same range. In this example, the spindle S1 will do relatively heavy work, S2 somewhat lighter, S3 falls lower in the scale, and S4 ranks as a sensitive drill. A combination such as this permits of a wide range of rapid work, and the accuracy phase of the situation is attended to through the use of jigs and drills or reamers, which are kept in good working order by tool makers in the tool room, thus eliminating the uncertainties which come if a plurality of workmen are permitted to follow the bent of their own inclination in the shop.

Radial Drills Serve Many Important Purposes

In the finishing of crankcases for motors and transmission gearcases, there are a considerable number of operations which may be done with precision and dispatch if suitable fixtures are utilized and radial drills are employed in the process. D, plate 1 presents a stout radial drill in connection with a fixture working on a motorcase, and a jig G1 guides the tool T1 into the work W1.

Straddle Mills Do Quick and Accurate Work

As an illustration of the utility mills E, plate 2 is offered, in which the work W1 is clamped to the platen P1 by means of the clamp C1, and the straddle mills S1 and S2 are utilized simultaneously in the facing off of the work. The distance between the straddle mills is fixed in view of the facing distance desired, and this idea has a wide application, provided the mill is sufficiently large and rigid to stand up under the increased rate of cutting.

Vertical Millers Handle Certain Work

Referring to F, plate 2, a vertical milling machine M1, with its spindle S1, has an end R1 engaged in routing out an aluminum half-time gear cover C1. In former times work of this character was done by means of vertical milling heads, which were attached to horizontal milling machines. For the lighter character of work this form of attachment served very well indeed, but the practice at the present time in the plants where automobiles are manufactured, demands far greater stability than is ordinarily obtained by means of an attachment of an auxiliary character.

Broaching Machine for Making Square Holes

One of the class of machine tools which was developed to a high stage in response to the demand of automobile makers was that which rendered it possible to broach square holes in gears as used in the transmission system. G, plate 2, shows a Lapointe broaching machine in operation, and the broaching tool, which does not show clearly, is actuated by the screw S1, which is of great power, which produces the square hole H1 in the gear G1 as shown. The capacity of this form of tool is so great that

the old apathy to square hole work has entirely disappeared. This character of work is now done with substantially the same facility as obtains in connection with the drilling and reaming of a round hole.

Divers Automatic Machine Tool Equipments

It would be impossible to show even a reasonable few of the total number of splendid machine tool equipments employed in a plant such as the one of the subject. Many of the operations are completed on automatic machine tools, and the personal equation, which is so prone to interfere with the interchangeability of parts, is substantially done away with on the ground that the cutting no one tooth is completed by a single cut; a series of cuts taken progressively one tooth after the other results ultimately in the completion of the cutting of the whole number of teeth, and the accuracy thus encompassed is beyond that rendered ordinarily possible, because the gear blank is cut at a constant temperature and the strains induced are but slight, so that distortions during the period of cutting are substantially eliminated.

Cylinder Design Indicates Engineering Skill

In view of the excellence of design of the cylinders, which is a matter of maximum importance in automobile work, it was deemed expedient to reproduce the working drawings and thereby

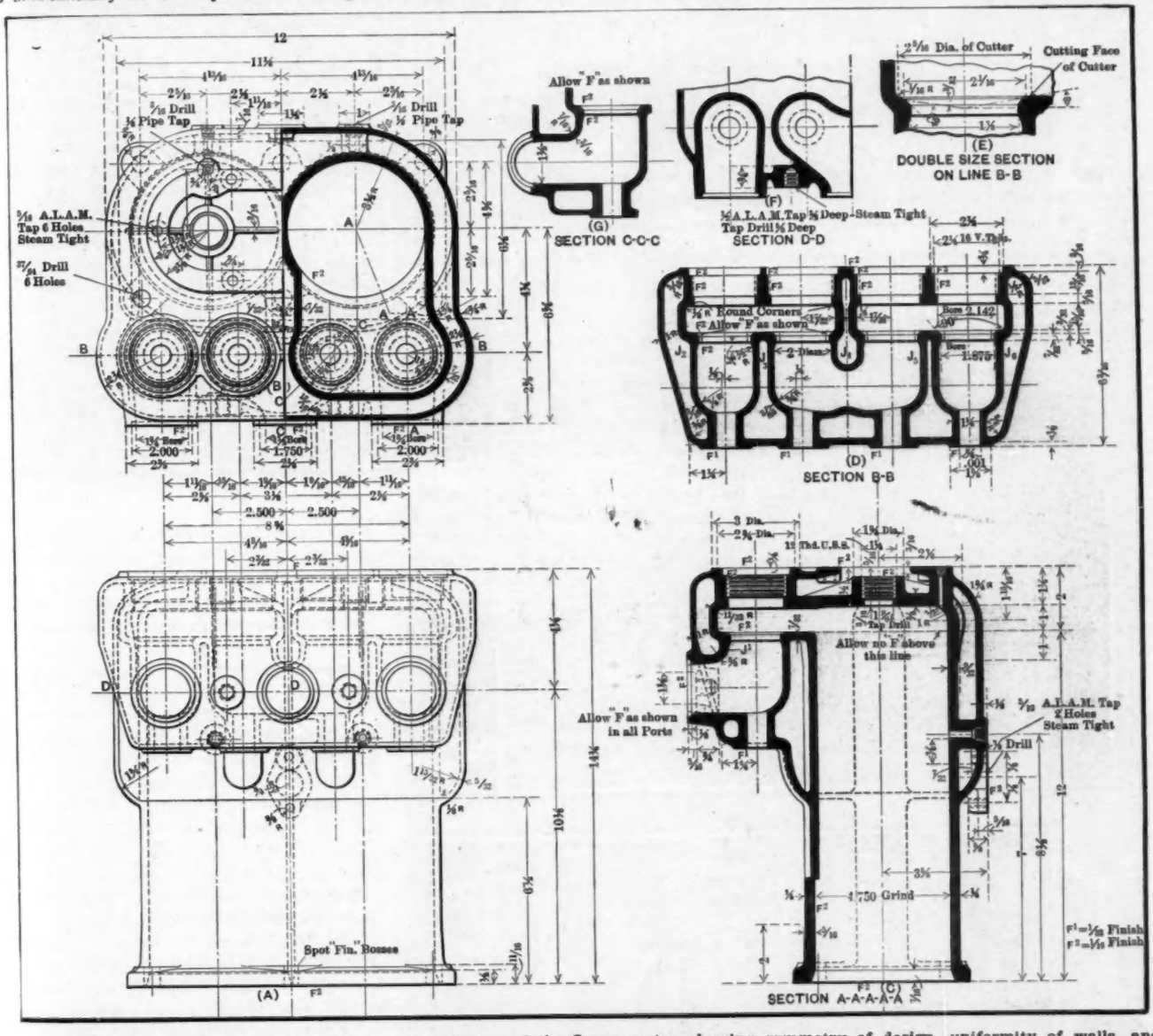


Fig. 1—Reproduced from working drawings of the cylinders of the Owen motor showing symmetry of design, uniformity of walls, and completely water-jacketed valve seats

tools, of whatever character they may be, are sharpened and sized by tool makers who are provided with every facility for the purpose, and a system of inspection in vogue renders it quite impossible for the artisans to make a mistake of sufficient magnitude to get by the work inspectors who take charge of the product from time to time as the occasion requires. Gear cutting is one of the classes of work which comes within the pale of the automatic system, and H, plate 2, shows one form of gear cutter which has a wide use in connection with the completing of sliding gears. The Fellow's shaper S1, with its reciprocating cutter C1, fashions the gear G1 by a progressive method of cutting, so that more nearly portray the true situation, than will be possible in any other way. Referring to Fig. 1, (A) depicts the exterior of the twin cylinders on the valve chamber side, (B) is a plan in part section looking down upon the cylinders, (C) is a section through A A A A A A, (D) is a section through B B, (E) is a section through one of the valves on the line B B, (F) is a section through D D and (G) is a section through C C C.

Referring to (C) Fig. 1, the cylinder walls are 1-4 inch thick in the main, but at a point approaching the flanging at the bottom the thickness is increased to 5-16 of an inch, beginning at a distance of 2 inches above the bottom line. In order that the

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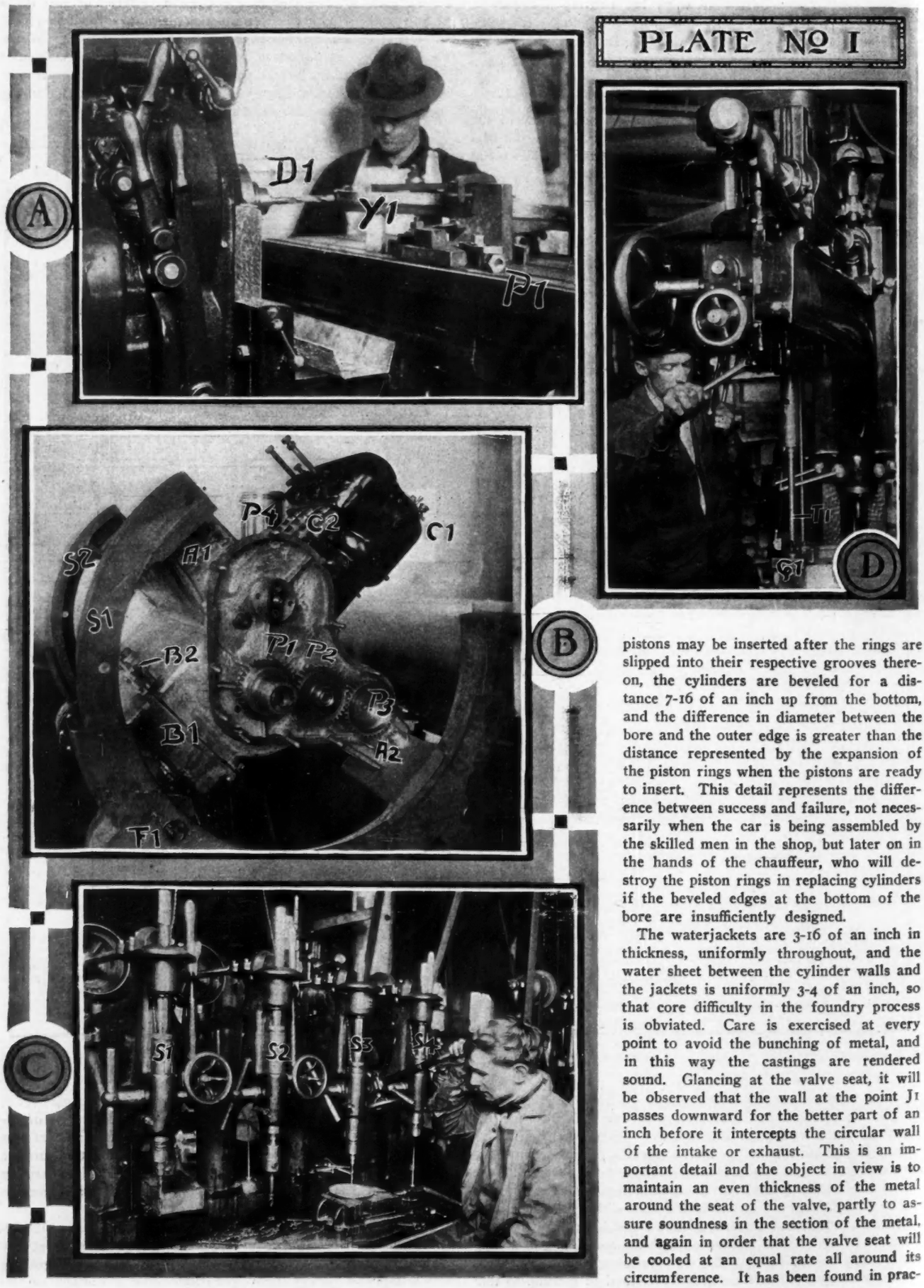
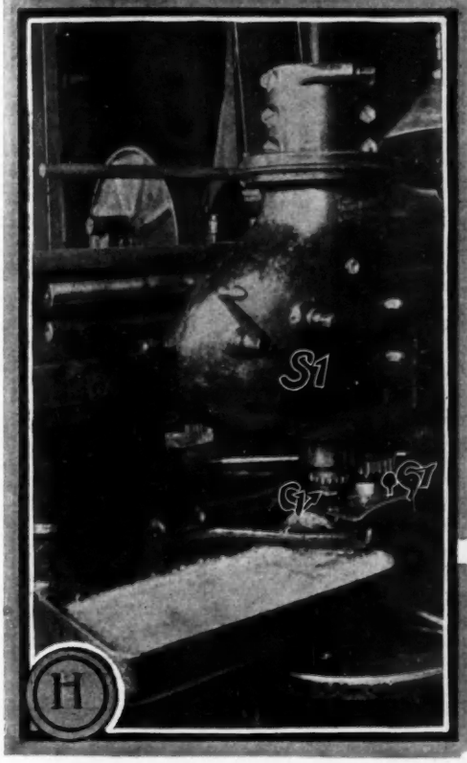
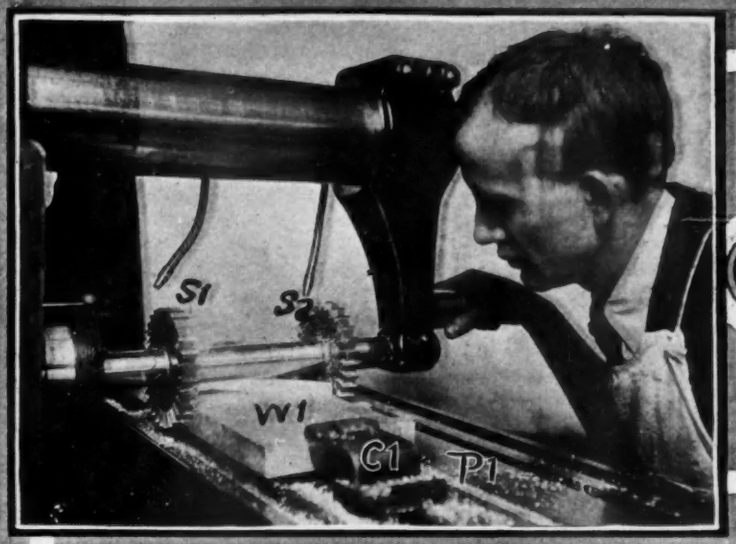


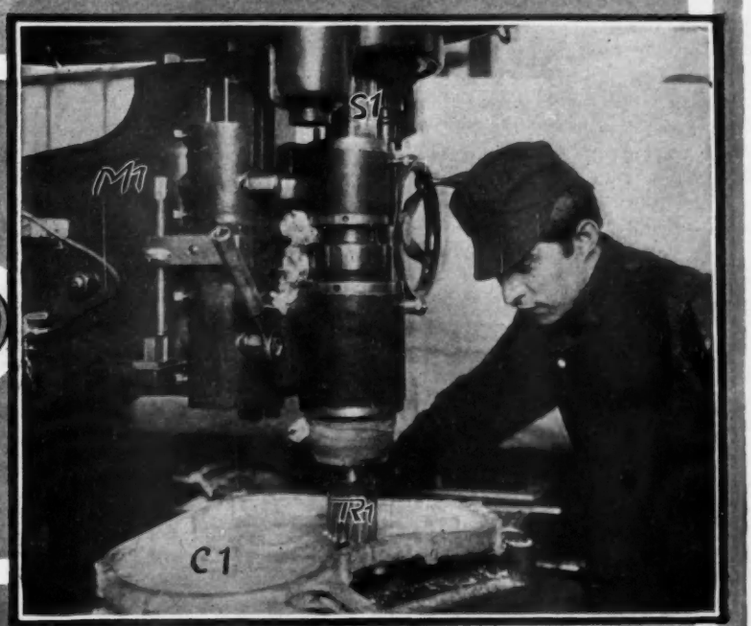
pistons may be inserted after the rings are slipped into their respective grooves thereon, the cylinders are beveled for a distance 7-16 of an inch up from the bottom, and the difference in diameter between the bore and the outer edge is greater than the distance represented by the expansion of the piston rings when the pistons are ready to insert. This detail represents the difference between success and failure, not necessarily when the car is being assembled by the skilled men in the shop, but later on in the hands of the chauffeur, who will destroy the piston rings in replacing cylinders if the beveled edges at the bottom of the bore are insufficiently designed.

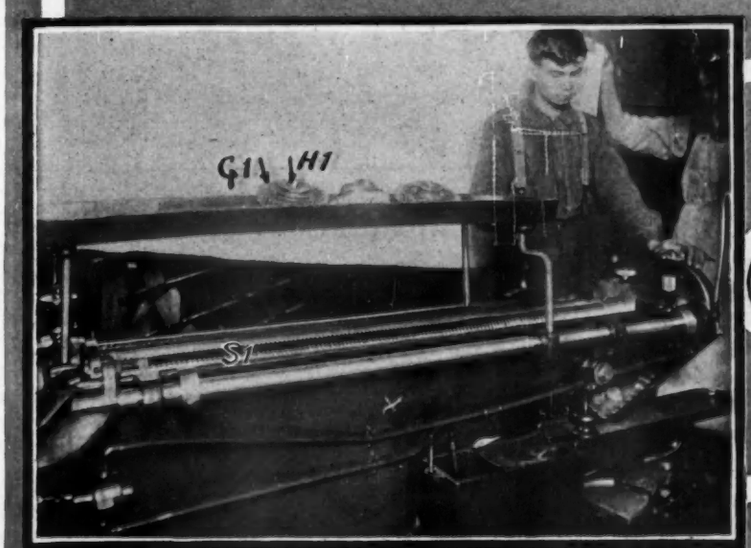
The waterjackets are 3-16 of an inch in thickness, uniformly throughout, and the water sheet between the cylinder walls and the jackets is uniformly 3-4 of an inch, so that core difficulty in the foundry process is obviated. Care is exercised at every point to avoid the bunching of metal, and in this way the castings are rendered sound. Glancing at the valve seat, it will be observed that the wall at the point J1 passes downward for the better part of an inch before it intercepts the circular wall of the intake or exhaust. This is an important detail and the object in view is to maintain an even thickness of the metal around the seat of the valve, partly to assure soundness in the section of the metal, and again in order that the valve seat will be cooled at an equal rate all around its circumference. It has been found in prac-

PLATE No II









tice that if the valve seats are only cooled for a part of the way around, the differences in temperature directly due to this inequality will produce an elliptical formation of the seat, and tightness will then be impossible.

Section E shows the valve seat detail, it being of the 45-degree beveled type, and above the valve the difference in diameter is increased enough so that the cutter which is used in fashioning the valve seat has ample clearance, and the metal on the top faces of the valves may be slicked down sufficiently to assure a perfect uniformity at all points in the diameter. Glancing at (D), which shows through the section B B, a further insight into the care with which the valve seats are waterjacketed will be given. J2, J3, J4, J5 and J6 are the points in the waterjacket adjacent to the valve seats at which trouble is wholly avoided, due to the provision of a uniform sheet of water around the exterior surface adjacent to the seats.

The valve stems are bushed, the idea being to maintain a certain tightness, and in the course of time as service shows effect the bushings may be replaced, if it is deemed expedient to do so. In order to assure a liberal heat transfer between the valve, its stem, the bushing, and the jacket walls to the water, the bushings are pressed in, and the character of the workmanship throughout is consistent with the objects sought.

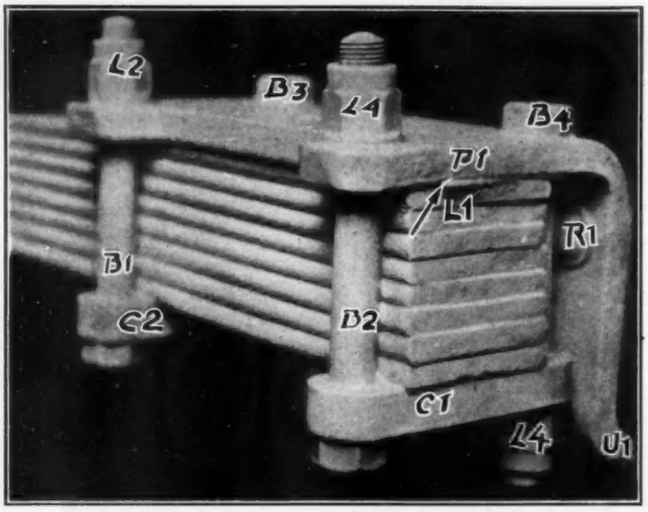


Fig. 2—Security fastening of the three-quarter elliptic spring suspension at the rear of the Owen automobile, utilizing a pressed steel bracket and locking methods

Glancing at the top of the cylinder in the view (C) the combustion chamber has an accommodation hole through which the core print passes, thus preventing the cores from shifting during the process of casting. This hole in each cylinder is threaded, and the plug which is threaded to match is provided with an overhang and a copper-faced gasket, so that when the plug is screwed home the copper-faced gasket is locked into place and tightness is assured.

There are divers other important features of design, which a closer study of the figures here presented will disclose, but the dimensions are all given, and beyond referring to the symmetry of the design and the general good appearance of the completed cylinders, the reader will be left to his own devices for the rest.

Conspicuous Design Features Throughout Chassis

The old idea of utilizing steel castings or malleable iron members in the construction of the chassis has lost favor on account of the uncertainties of castings. Fig. 2 shows how the three-quarter elliptical spring suspension is anchored to the frame and the pressed steel anchorage P1 is riveted R1 (of which there are a suitable number) to the chassis frame, but it also passes under the frame at the point U1, where it is also riveted to the flange of the frame. A cross-member at this point takes care of the stresses induced, and, as the illustration depicts, the metal is in sufficient presence in the pressed steel member to assure stability. The spring is held in place by clamping bolts B1, B2, B3 and B4, and pressure is induced between the pressed-steel member P1 and the cross-bars C1 and C2. There are eight flat plates in this portion of the spring; they are all of the same thickness and relatively wide. A measure of flexibility is induced by means of a thin strip of leather L1, which is placed between the top plate and the pressed-steel member P1. The whole system shows the earmarks of careful designing, and in view of the fact that springs will surely break if they are not tightly anchored, locking nuts L2, L3, L4 and L5 (the latter being hidden) are used in order that the clamping will remain tight in service, despite the tendency of nuts to back off.

Long Pistons Assure Tight Compression

Without attempting to cover all the points of merit, as they are presented in details of design, it will be considered enough to refer to one additional matter which supports the plan as a whole. The motor is of the long stroke type, and Fig. 3 shows the four pistons with the connecting rods and rings complete, in which P1, P2, P3 and P4 are the pistons, and the rings R1, there being three for each piston, are especially designed with a view to lightness, experience having shown that a light ring well designed will last longer and do better work than a wide and heavy ring. The joints J1 of the rings are cut on the bias. The connecting rods C1, C2, C3 and C4 are drop forged from a suitable grade of steel, are substantially of the H section, and are tapered so that the greatest strength in one plane comes at a point .6 of the whole distance up from the center of the large end at the crankpin. The caps C5 are held by four bolts, each

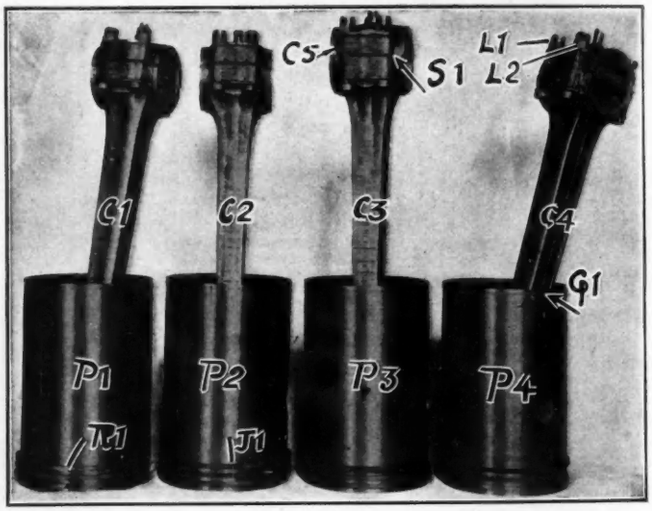


Fig. 3—The four piston units of the Owen motor showing an H-section connecting-rod system, long pistons, and relatively light packing rings

one of which is maintained in secure relation by locking nuts L1, L2, etc., and shims S1 are introduced for the purpose of permitting the autoist or his repairman to take up on the crankpin bearings, if in the course of time in service slack is induced. Perhaps the most important detail shown in this figure is the relatively great length of the pistons, not forgetting that an oil groove G1 is cut at the bottom of each of the pistons.

Specifications of the Owen Automobile

Type of body, six-passenger, fully enclosed.
Wheelbase, 120 inches.
Tread, 56 inches.
Tire equipment, 42 x 4-inch quick demountable.
Size of motor, 4 3-4 x 6 inches bore and stroke, respectively.
Motor rating, 50 horsepower.
Type of cylinders, L-head with inlet and exhaust valves on right side.
Crankshaft pins and bearings, 2 inches in diameter.
Crankshaft bearings, expanded Parsons white bronze.
Valve lifts, adjustable with rollers.
Water pump, centrifugal.
Ignition, high-tension magneto with coil and battery auxiliary.
Carbureter, float and nozzle type with auxiliary air valve.
Lubrication, splash system with pump for constant level and sump in crankcase.
Clutch, leather faced cone type with expanding springs.
Transmission gear, three speeds and reverse.
Transmission gear bearings, plain faced with Parsons white metal.
Transmission control, center line of car.
Driver's seat, left-hand side, making control right handed.
Front axle, drop forged special steel in one piece.
Rear axle, full floating type, with bevel differential.
Front springs, half elliptical, 2 1-4-inch wide plates, 40-inch span.
Rear springs, three-quarter elliptical, 2 1-4-inch wide plates, 50-inch span.
Emergency brakes, internal expanding emergency located on rear wheels, operated through beam equalizer and pedaled by right foot.
Service brakes, external contracting on drum on rear wheel, operated through beam equalizer and pedaled by left foot.
Steering gear, worm and babbitted nut, with ball thrust through 18-inch steering wheel.
Location of steering wheel, left side of car.
Chassis frame, channel section steel with double drop, offset front and inserted wooden skids for transmission gear-set.
Half-time gears, helical type.

New Plant Where Selden Cars Are Built

By MORRIS A. HALL

NEW factories always interest, as showing just what "the other fellow" is doing in the way of buildings and equipment, but the new factory just occupied at Rochester, N. Y., by the Selden Motor Vehicle Company, of which George B. Selden is the president, carries an additional interest for the very reason of Mr. Selden being connected with it.

To be exact, the factory, which will be described in the following pages, is not located right in the city of Rochester, being at Brighton, a suburb of that city, some two miles from the business center. It is easily and quickly reached from the center of the city, however, by trolley lines which run within one short block, by electric express running right past the plant, and by automobile, through one of the most delightful of Rochester's flower-lined streets, and over excellent pavement.

The factory is of brick, concrete, and wood, of what is technically known as slow-burning construction. The outer walls are of brick, the columns of concrete or 10 by 10 timber, in some cases, with iron caps, while the floors present a novelty in the building line, being of two by eight timbers laid on edge, and nailed together sideways, while the floor surfaces, of seven-eighths hard wood, are laid on top of this, being of matched lumber. The whole has all of the desirable qualities of a factory floor, being low in price, fairly good as a fire risk, easy and quick to erect, simple and cheap to replace, strong to carry loads, and, last but not least, easy on the feet of the men.

The ground floor has, however, concrete floors, while the main office entrance has tiled, and the offices ornamental hardwood floors. The master building, if so it might be called, is two stories in height, and rectangular in section, being some 298 ft. long by 62 ft. wide. From the center of this projects the secondary portion, this being another rectangle, closely approaching a square, as to fingers, being 100 ft. long by 128 ft. wide. From this, again, there is a rectangular projecting part, this latter being the power house and heating plant. This is small in size, as compared with the other very long buildings, but ample for the purpose. In the location and planning of the latter structure is to be found an example of the excellent headwork pervading the whole layout. The factory has its own railroad siding, and the upper end of this carries right past the power house. The latter appears like any of the other buildings on the outside, but, when entered, the floor level upon which the boilers and auxiliaries are placed is found to be dropped down much below the level of the other floors. At first sight the reason for this is not apparent, but upon close inspection it is seen to be for the purpose of reducing the handling of the fuels for the plant to a minimum. The end of the railroad siding carries up over the coal pit of the plant, being supported in such a way as to leave plenty of open space. To dump a carload of coal, then, the car is run up, over the pit, and dumped directly downward, without any handling.

Then the coal lies upon the boiler room floor level, and the work of handling it is reduced to the simple act of swinging it from coal pit to boiler door. Since this entirely eliminates all coal-pile trimming, and similar work, considerable money is saved in the operation of the plant. There are many other similar but money-saving little economies in the plant.

To return to the buildings and their ground layout, another small rectangular projection from the larger main building will be noted in the floor plans, given elsewhere in this article. This is for the elevator and stairs, and the rectangular building housing them is entirely of brick and concrete, thus making that part of the building wholly fireproof. This, combined with its isolation from the other buildings, although in juxtaposition with them, keeps the fire risk to employees and material very low. There are, too, other advantages in this planning which do not appear from the first casual inspection of the plans.

Forming the other two sides of a hollow square with the main buildings is a long, low, wooden structure, in which the engines and cars are tested. This building, which will be described in more detail later, is but one story high, and is divided into three parts, one for engine testing, after the engines are assembled in the cars, one for testing of the completed cars, and the third for experimental work and the construction of special work. The whole building makes a home from which the testers work out, the road testers making this their base from which to give all cars such a try-out as no purchaser of the finished car will ever think of subjecting his property to.

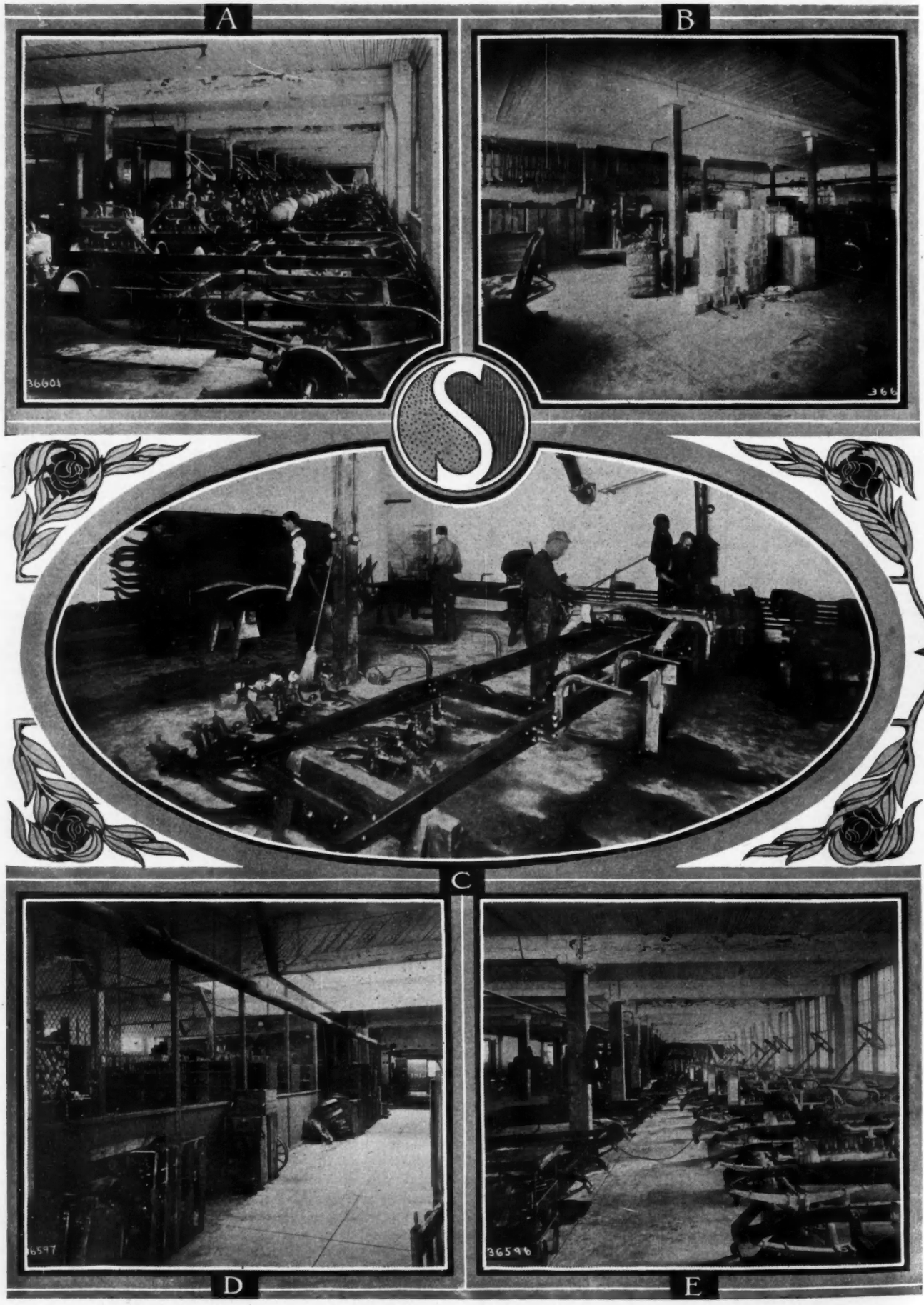
In the factory layout, the ground floor of the main building is occupied by the reception hall, timekeepers' offices, stairways to the second floor, dining room for the men, to be spoken of later, storage for finished cars awaiting shipping order, assembling of chassis as well as parts, stock room, testing and final assembly room, shipping and receiving room, blacksmith shop and initial frame and axle assembly room, power house, and testing rooms, as previously described.

Second floor arrangement is as follows: Front end, officers' rooms, general offices and bookkeepers' rooms, drafting rooms and chief engineer's offices, back of which are the rooms for final assembling of bodies, fitting of dashboards, wiring of electrical system, etc. Beyond this, going toward the back, is the chassis painting room, and, at the extreme end of the floor, varnishing and body painting room. This floor level shows also the skylights or saw-tooth roof of the one-story building.

This saw-tooth arrangement of the building of lower height is resorted to in order to give as much light as possible, the same effect being obtained in the larger, longer building through the very large number of windows along the two sides of the comparatively narrow building. The result, at any rate and however it is obtained, is that of an unusually light factory. Since plenty of light always makes for cleanliness, by making dirt more prominent, this results in the whole plant being unusually clean. The final or ultimate result is to give a better place for the men to work in, and, consequently, do better work and more of it. It is thus an asset to the firm, which thought doubtless carried some weight when the planning was done.

As to factory organization, the firm has one head and several associate heads, the whole working downward in a sort of pyramid, from the man alone at the top, to the two hundred-odd employees, the latter being a number which is constantly augmented as employees of the desirable class are obtainable. George B. Selden is president, and with the vice-president, Louis A. Fischer, of Buffalo, and the secretary-treasurer, John H. Stedman, cares for the larger problems of finance and administration. Robert H. Salmons is vice-president and general manager in direct charge of the factory. Working down from the manager, under him are the departmental heads of smaller calibre, such as factory head or superintendent, sales manager, advertising and publicity manager, purchasing agent, and chief engineer in charge of all design, specification of materials, as well as general outline of the processes to be used in fabricating the parts. Below these, in turn, come the smaller departmental heads, in charge of restricted and specific parts of the work, as the various foremen, shipping and receiving clerk, bookkeepers, timekeepers, foreman painter, stock clerk, head tester, assembling foreman, engineer, chief draftsman, etc.

With this form of organization, the course pursued from raw materials and assembled parts, bought outside, up to the finished and painted automobile, ready for shipment, is about as follows: The raw materials, in the form of bar stock, flat and round iron, etc., bolts and nuts, assembled steering gears, radiators, magnetos, coils, batteries, carbureters, wheels, tires, and similar parts come in by freight on the company's own siding. After unloading directly into the shipping clerks' room they are in-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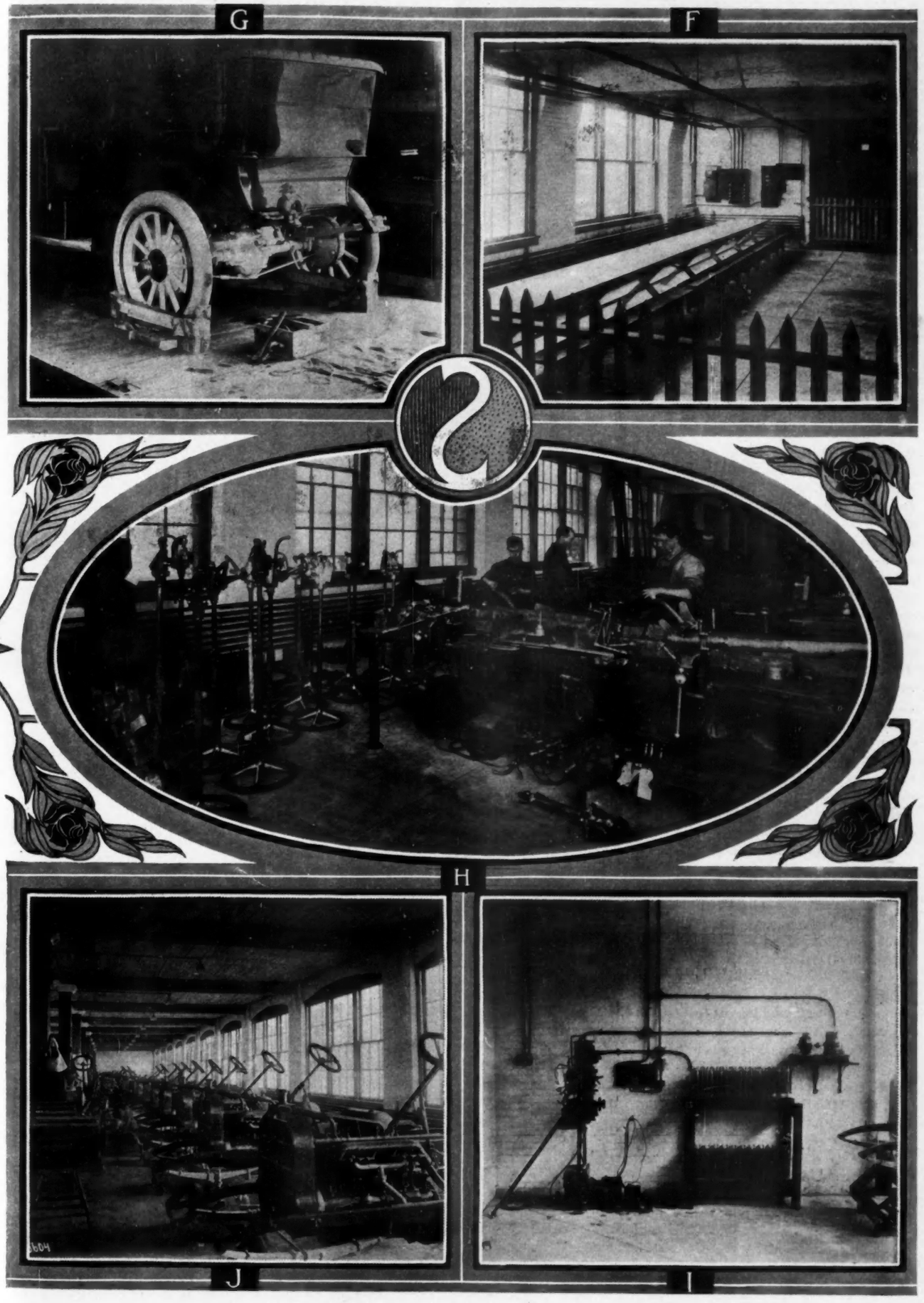
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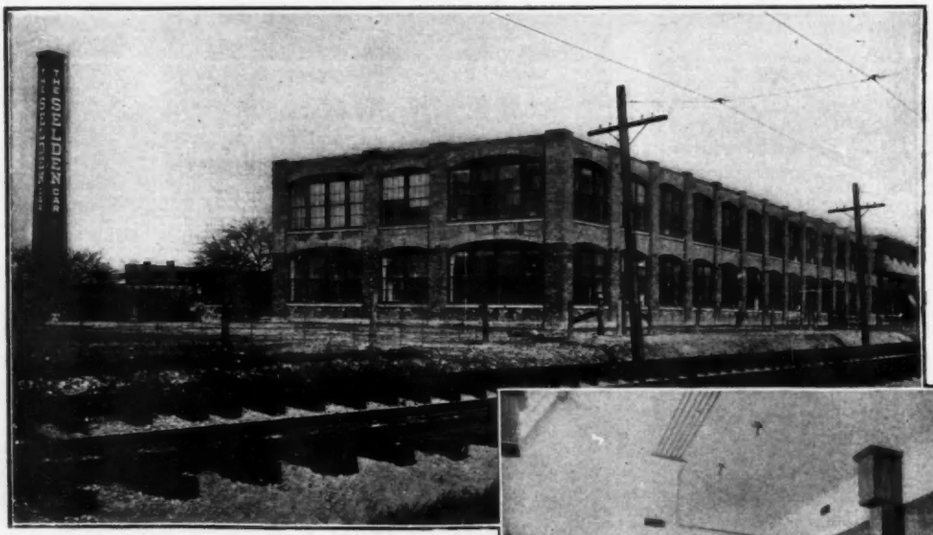


Selden Factory, Showing Electric Tracks

Second Floor Office View, Displaying Excellent Lighting and Plenty of Space

spected, and then go to the stock room, there to be drawn out for use as needed on departmental requisition. Both receiving department and stock rooms are on the ground floor and close to the assembling room, where the parts are to be used. This makes the travel of materials and parts about the plant as short and as quick as is possible.

In the panels on the previous pages, picture B of the first panel shows one corner of the shipping room, with its boxes and barrels of materials, coming in fast, for this company seem to have the railroad hypnotized to the extent of getting all of the freight cars needed for either ingoing materials or outgoing finished cars. At D of the same panel is seen the stock room, or at least a view of one corner of it. This stock room incorporates one very new feature in the tire room. The tire men have always asked for a dark, cool room, so when the factory was built a tire room was built to conform to these specifications. This is a basement proposition, being below the stock room, a vault specially built in for holding tires. It is reached through a trap door in the stock room floor, and has no windows.

In the same panel, picture A shows the chassis-assembling room, with a typical row of cars undergoing completion. The picture shows some 14 or 15 machines, but the exigencies of taking the picture were such as to preclude getting all those which were on the floor at that time, amounting to about 25. In a pinch, the floor space and arrangement are such that as high as 35 machines could be set up at one time. The picture also brings out one point not usually noted. This is the location of the gasoline tank on the chassis, under the front seat position, this being placed there at the start, and staying there throughout all of the strenuous testing of the car. In short, the gasoline tank is permanently affixed to the chassis at the start, the chassis then being tested with its own tank in place. In the usual case, this tank is carried on the body, and consequently is not attached until the body is put on, the testing being done with a special testing seat, carrying its own gasoline tank.

Picture C shows the blacksmith shop, where the assembling operations are commenced, the springs and axles being attached to the pressed steel frame, while the step and fender irons are also put on. The view shows clearly three or four frames being started, the one in the immediate foreground having the rear spring hangers in place, the front spring hangers, springs, and axle just being fastened. Also, the step and fender irons are in place.

At the lower right-hand corner is the assembling room for the chassis, another view being presented. This view reveals the tote boxes, in which materials, small parts, and all the little accessories needful to the men in assembling are carried around the shop. At the left a glimpse is had of a series of frames undergoing what might be called the second operation of assembling, this being the attachment of the secondary accessories, such as steering gears, etc. The view does not show it, but all frames after this second operation are mounted upon a special truck, designed for the work it has to do. This is a very neat, strong, serviceable little truck, and will be made the subject of future mention. In the main, it fits under the front and rear axles, interchangeably, and has four rollers, upon which the load may be wheeled around the shop, these being swivel mounted, so as to turn freely.

The second panel of pictures shows more features than corporate parts of the production processes. Picture F is the lunch room for employees, which the management has provided to enable the men to have a hot dinner without going out of the plant. While later plans may include the serving of such a meal at cost, the present situation is that the men employ someone from nearby to come in just before noon, bringing the noon meal, together with the necessary dishes and equipment. The photo gives small idea of the size of the room or of its clean, well-lighted appearance. The real size is such as to seat the whole factory force, with proper table space.

In addition to the dining room, the employees are well cared for elsewhere around the plant in other ways. On each floor, in every department, are provided a number of porcelain-lined wash stands for the men to wash up at, with both hot and cold water. Elsewhere, lockers are provided, while toilet rooms are many and well located. For the office force, the same arrangements, but upon a more generous and elaborate scale, are made.

Alongside of this, picture G shows a finished car placed in the box car which is to convey it to some happy purchaser. The wheels are blocked up and fastened in place, so as to hold the car firmly against the shifting and sudden starting and stopping which the freight car is sure to go through. This little matter

only brings out with clearness the great care used throughout the construction of the car to have everything come to the ultimate consumer in perfect condition. Blocks, shaped to a fit, are placed under the front and rear sides of the inflated tires, both being wrapped with burlap. These are nailed fast to the car floor, as are also the second blocks, the purpose of which is to keep the car from sliding sideways. Finally, the whole is tied together by means of the longitudinals. H shows the corner of the parts-assembling department in which the steering gears are tested and adjusted, as well as the assembling of gear boxes, their testing, assembling and testing of reach rods, operating levers, and many other of the important little parts.

As the parts come in, the small groups are assembled, then sent to the stock room, after a very thorough test. This includes testing for accuracy of fits of shafts in bearings, sideways tests for play or shake, tests for sufficiency of lubrication, tests for correct meshing of gears, for accurate fitting of keys and cotters, and many other similar little tests, all of which has a very decided influence upon the character and worth of the finished and ready-to-use car.

Below this are seen, at I, the charging panel at which storage batteries are charged, through the medium of the mercury arc rectifier, with the batteries, magneto, and other components of a very complete and thorough telephone installation. This latter is supplemented by means of a series of signals, through the medium of many bells, well distributed, by which any officer or foreman may be located in the shop and called to the office on a moment's notice.

Throughout the plant, electricity is used freely, the chassis-assembling room, for instance, having a lamp over the location of each and every chassis, or the space which each chassis would occupy. If, then, the shortage of good workmen keeps up so that it ever becomes necessary to resort to extra shifts or night work to keep up with the orders, the factory is well equipped and suited to the work.

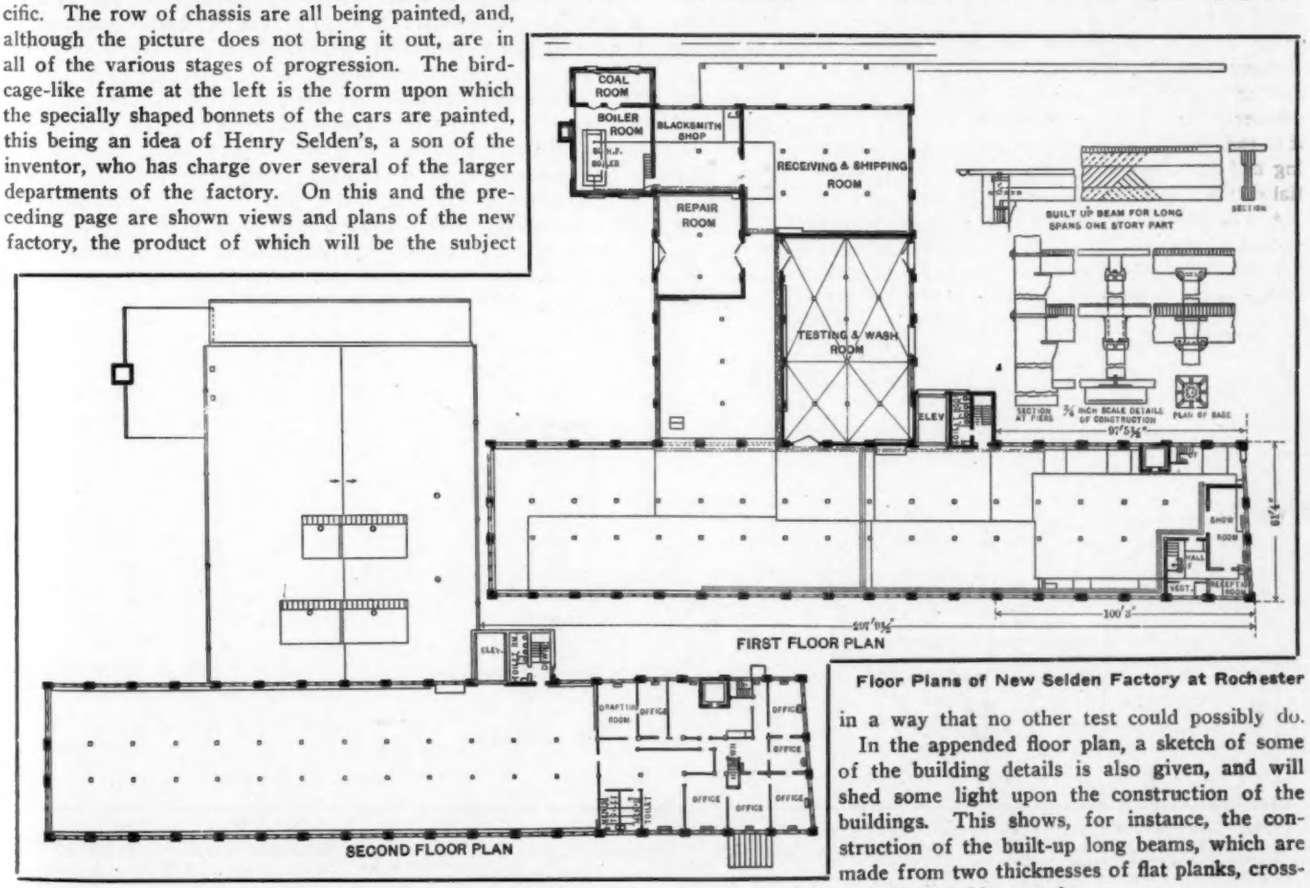
J is a scene on the second floor, in the paint shop, to be specific. The row of chassis are all being painted, and, although the picture does not bring it out, are in all of the various stages of progression. The bird-cage-like frame at the left is the form upon which the specially shaped bonnets of the cars are painted, this being an idea of Henry Selden's, a son of the inventor, who has charge over several of the larger departments of the factory. On this and the preceding page are shown views and plans of the new factory, the product of which will be the subject of a future article, dealing specifically with the small details.

Testing taken as a whole, is very thorough, unusually so, and will be made the subject of later notice and comment. Not alone are the small parts tested during and after assembling, but the engines undergo a quadruple test, first the usual block test at the conclusion of the assembling process, and following the more usual run-in test. Second, the engine is tested after being put into the chassis, this being to make sure that everything is all right before going out on the road with it.

After that the wheels are put on, and when the chassis has been wholly assembled, the third or road test follows, this being unusually severe, both as to speed expected and as to hill-climbing ability. Next, the outside test having been completed, all the loose fits having been found and corrected, as well as all of the adjustments having been made, tested and proven, then corrected, the car goes to the paint shop, receiving its final dress, after which a body is placed upon it, and the latter is finished up, ready to go out. After all this has been done and the car is actually ready to ship, old wheels with still older tires are substituted for the new wheels with new tires, and the car gets its final test. This consists of two parts, one the outside road performance, and the other the dynamometer and stationary test. The two differ only in that in one the power is measured and in the other it is not. In these tests, the car is run into the testing shed, and the rear wheels run onto a pair of rollers, set into the floor, so as to project but an inch or so. There are a number of sets of these to take care of the large number of cars being turned out, namely, 600 for the current year, which figure will be raised to no less than double that, or 1,200 for 1911.

Of these a few have dynamometer attachment so that the power is measured, this being the actual power delivered to the road wheels, and not any formula or rating power. The others are just plain rollers, and the wheels just revolve idly, the idea being to test out the action of the engine and whole chassis, under actual working conditions. This test is one which brings out the sterling qualities of the radiator, and heat-dispensing system in a way that no other test could possibly do.

In the appended floor plan, a sketch of some of the building details is also given, and will shed some light upon the construction of the buildings. This shows, for instance, the construction of the built-up long beams, which are made from two thicknesses of flat planks, cross-nailed and laid at angles.



Floor Plans of New Selden Factory at Rochester

Second Floor Plan Showing Saw-tooth Roof.

The Magneto—Why It Makes Sparks

By HERBERT L. TOWLE

A MAGNETO is in some respects a delicate piece of apparatus. It possesses many special characteristics which do not appear on the surface which can be learned by careful study, or as the result of ill-considered blundering. The best advice that can be given the owner of a magneto is to let it alone till he has both definite occasion to do otherwise and the necessary knowledge to act correctly. When a magneto does need something done to it besides the customary oiling and letting alone, the user's path is far easier if he understands the principle of the thing. To do so is not in reality very difficult, provided one starts with the elementary principles of electromagnetic induction. Most of the obscurity surrounding the subject is due to the fact that the average owner tries to skip the rudiments and begin at the top.

A magneto generates current in the same manner that a dynamo does, namely, by the motion of wires across the "field" between magnetic poles. To move these wires takes power roughly proportional to the electrical energy thereby produced; thus we say that mechanical is converted into electrical energy.

Precisely what is induction? It is the production of current in a wire (or other conductor) owing to changes in a magnetic field surrounding it. This magnetic field may be due to a magnet, or it may be due to an electric current flowing in another wire adjacent to the first, but not connected with it.

Take the familiar battery induction coil, Fig. 1. It has a primary winding of a few turns of coarse insulated wire through which the battery current flows. Surrounding the primary coil is the secondary coil, consisting of a large number of turns of small wire wholly insulated from the first coil. If the terminals of the secondary winding are brought close together as at *A*, and if the current flowing through the primary winding is suddenly broken, as by snapping the ends of two wires across each other at *B*, a momentary current is induced in the secondary winding. The potential of the induced current is higher than that of the battery current in rough proportion to the greater number of turns in the secondary winding, with the result that it is sufficient to jump the air gap at *A*. If the secondary winding had only the same turns as the primary winding, the potential of the induced would be that of the primary current.

A steady flow of current in the primary winding induces no current in the secondary. It is only the change of current that has inductive effect, and the more abrupt this change is the higher is the potential or voltage of the induced current. Current is induced on closing the primary circuit as well as on breaking it, but owing to electrical and magnetic lag it is not strong enough to make a spark at *A*. Lag occurs on breaking the primary circuit also, and to reduce it a condenser is used to absorb the extra current which would otherwise produce a spark at the point *B*. The condenser will be referred to later.

Instead of closing and opening the primary circuit, current may be induced in the secondary by moving one coil inside the other (see Fig. 2). If the primary coil be quickly inserted in or withdrawn from the secondary coil, a momentary current will flow in the latter when its terminals are joined. This current may be shown by connecting a voltmeter to the terminals.

The direction of the induced current follows a definite rule, as follows: When the primary current *diminishes*, the induced current takes the *same* direction as the primary current (see Fig. 1). When the primary current *increases* the induced current is *opposite* in direction.

The primary coil in Fig. 2 has no iron core. The action would be stronger if a core were inserted. The core and coil would then form an electromagnet, having all the magnetic properties of a magetized bar of steel, but in higher degree. A permanent magnet could be substituted for the electromagnet, and its motion into and out of the secondary coil would produce similar effects. In fact, the quick motion of either a permanent magnet or electromagnet anywhere in the neighborhood of the secondary coil will induce a momentary current in the latter, if its circuit be closed.

To explain the similar behavior of permanent magnets, electromagnets and coreless coils (known as solenoids), the theory has been broached that the molecules in every magnet, permanent or temporary, are themselves miniature magnets and that each has an electric current constantly circulating around it, see Fig. 3. In a permanent magnet, which is hardened steel, the molecules are more or less rigidly fixed. In the soft iron core of the electromagnet the molecules are plastic and assume a regular formation only under the influence of an electric current in the surrounding coil. When the current ceases, the molecules assume promiscuous positions like a heap of unmagnetized iron filings. This is only a theory, but it may help the reader to understand the relationship between magnets and electric coils.

Everyone has seen iron filings clinging to the poles of a magnet, and most readers of this article know that these filings group themselves in the direction of the magnetic lines of force

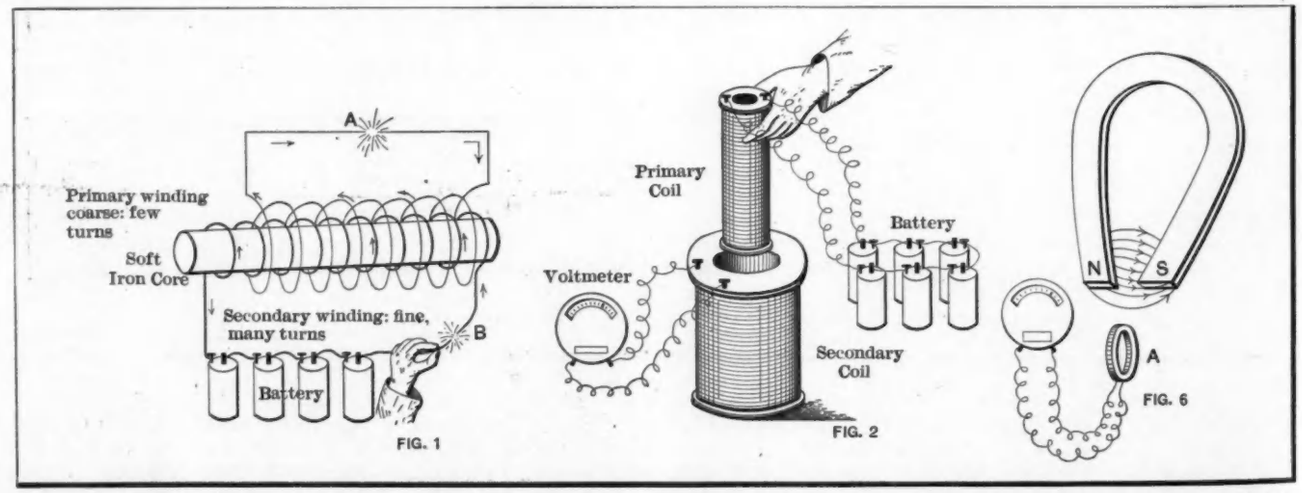


Fig. 1—Principle of ordinary battery induction coil, showing how current is induced in the outside winding by making or breaking a current in the inside or primary winding. Fig. 2—Showing how motion of an electric coil or magnet inside another coil induces a momentary current in the latter. Fig. 6—Lines of force of a horseshoe magnet, also showing how current may be induced in a coil, A, by moving it across the lines of force.

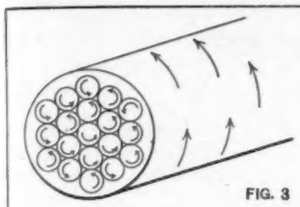


FIG. 3

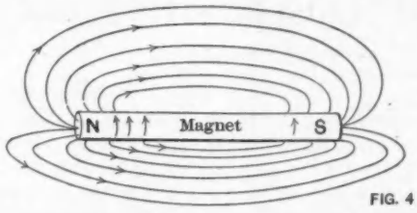


FIG. 4

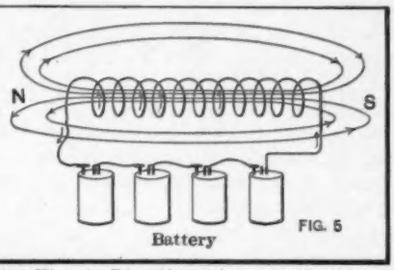


FIG. 5

Fig. 3—Direction of the theoretical molecular currents at the north end of a bar magnet. Fig. 4—Direction of magnetic lines of force surrounding a bar magnet. The small arrows on the magnet itself show the direction of the molecular currents. Fig. 5—Showing that the direction of lines of force through and around a charged helix is the same as in Fig. 4.

which run from pole to pole of any magnet. Fig. 4 shows the directions of the lines of force about a straight bar magnet. If one were to take an empty helix, Fig. 5, and dust iron filings on the sheet of paper close to it, one would find that the filings would assume the same positions as in Fig. 4. In a word, the magnetic lines of force go through the magnet or helix, emerge from the north pole, and go into the south pole. They traverse iron much more readily than air. The smaller the air gap, therefore, the stronger will be the "field" produced by a magnet of given size. That is the reason why the poles of a horseshoe magnet, Fig. 6, are brought close together.

We are now in a position to see that what induces current in the secondary coil is in reality *a change in the strength of the magnetic field* as represented by the lines of force passing through the coil. In the experiment of Fig. 2 the lines of force are not as strong as they might be, because they must travel through the air outside the coil or magnet to return from one pole to the other. If we take a horseshoe magnet whose poles are close together, and move a flat coil *A*, Fig. 6, quickly between the poles, we shall get a stronger induction compared to the size of the magnet, because the magnetic field is stronger. This leads us to the action of the magneto with horseshoe magnets, Fig. 7.

In Fig. 7 the pole pieces are marked *N* and *S* for convenience, and a few imaginary molecules are shown dotted on the north pole to help the reader to remember the direction of rotation of the supposed molecular electric currents. This will assist in fixing the direction of the current in the single wire coil, which is supposed to be rotating on its own axis between the poles. The ends *a b* of the coil are supposed to be connected.

The theory of induction in a rotating coil is somewhat speculative. It will, however, be sufficient for our present purpose to state the behavior of the induced current and let the theory alone. This behavior is as follows: When the plane of the coil is vertical the flow of induced current reaches zero and changes direction. When the coil is horizontal the flow is a maximum. At intermediate points the induced potential is proportional to the rate at which the number of lines of force passing through the coil is *changing*. As the lines of force are horizontal it is obvious that for an instant, when the coil is vertical, a slight angular movement produces no change in the number of those passing through the coil. In that position, therefore, no current is induced. When the coil is horizontal the number of lines of force passing through it is momentarily *nil*, and the *rate* of increase or decrease in their number per degree of coil rotation is a maximum at that point. For intermediate angles this rate of change is proportional to the sines of the angles of the coil position; hence the theoretical curve of induced potential is what is known as the *sine curve*, Fig. 8.

As this diagram shows, the current fluctuates regularly above and below the line of zero current, which means that it reverses its direction at the zero point when the coil is vertical This action will be readily apparent if the reader traces carefully the motion of the single coil in Figs. 7 and 9. In Fig. 7 the coil is rotating counter-clockwise, and the lines of force passing through it are diminishing. Therefore the induced current will be in the same direction as the theoretical molecular currents indicated on the pole piece, i.e., from *a*, counter-clockwise following the arrows to *b*. In Fig. 9 the coil has got past the position of maximum current and the included lines of force are increasing. The flow is, therefore, opposite to the molecular currents; but meanwhile the coil itself has been reversed.

(To be continued.)

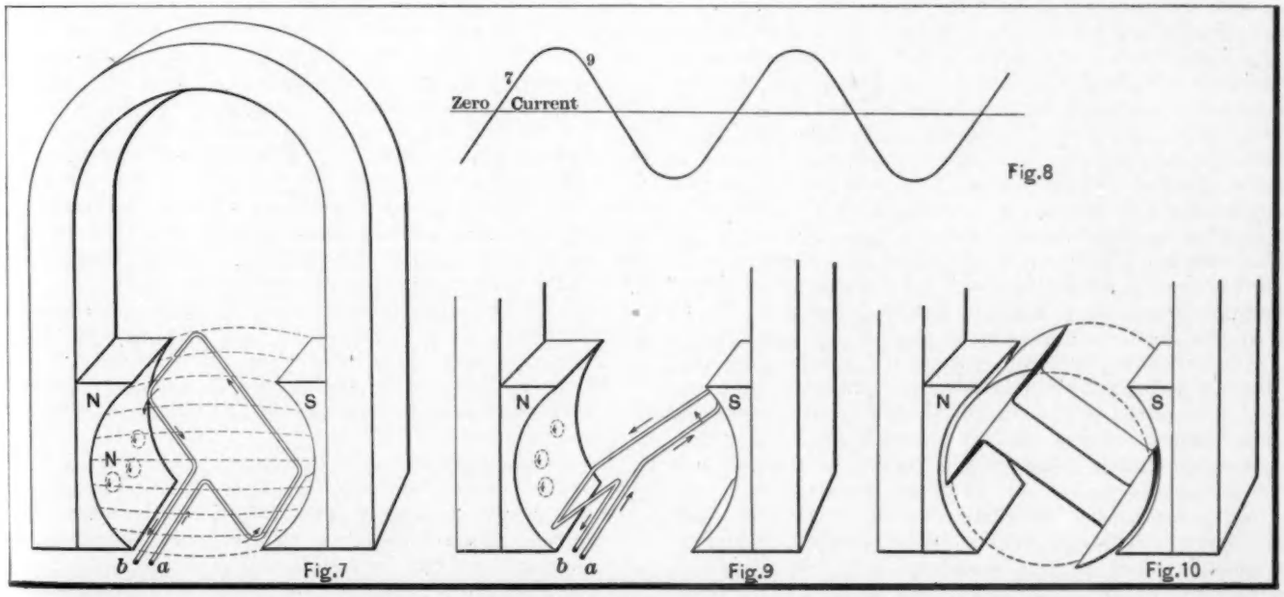


Fig. 7—Current induced in a coil rotating on its axis between two poles. Fig. 8—The theoretical sine curve of magneto current. Fig. 9—Showing direction of current with further rotation of coil. Fig. 10—Core of H armature.

Best Means For Dustproofing the Highway

By MARIUS C. KRARUP

(*Continued from last week.*)

coal tar, can possibly become popularly accepted in practice, the solution of the dustless road problem offered by the investigating engineers and the construction companies must be declared to be academic, so far as the problem and the public are concerned, though it may be quite practical for the companies and for those communities which take advantage of it quickly. The good roads movement, while giving thanks for one solution, must insist that no solution be accepted as final whose general acceptance will pile economical hindrances in the way of its own practical application, and that therefore all other methods which promise results in the way of dustproofing the thoroughfares, even if these results are at present inferior, shall be followed up and improved until all of them combined furnish a variety of road engineering materials competing with each other and sufficient for the permanent and increasing needs of the public, both in quality and quantity. The situation created through the demand for dustless construction is a new one in the annals of road-building. Heretofore, though local scarcity of stone or sand or gravel and of any other one of the needed materials has been common, there has never been an absolute natural or industrial limit to the necessary supplies, and engineers have had a free hand in specifying one material or another as best adapted to a given purpose, with due regard to current prices and freight. With the dustproofing problem before them, the engineer and road builder must in the long run, as the case seems to stand at present, find himself greatly assisted in his task by the public's inclination to accept processes of low first cost, for the less important roads, in spite of mathematical proof of greater economy in a method requiring a higher initial investment. This inclination must greatly facilitate the experiments required for developing materials and methods capable of meeting the competition with coal tar and bitulithic construction, and eventually placing at the public's disposal an unlimited quantity of the raw materials from which the luxury of road comfort is to be distilled—unless indeed the aeroplane is to solve the problem in another way.

While the present article does not deal with the technic of dustproofing methods, but only with the means for facilitating their adoption, it seems impossible to pass without mention the most obvious chances for making the annual supply of coal tar keep pace with the increasing demand for dustless roads, until other materials of equal merit shall have been developed. It is admitted by the authorities on the subject of tests, that all experiments which have been conducted in this country with coal tar treatment of old macadam roads, have been crude and wasteful, none of the special labor-saving machinery having been used, which immediately was designed and built in France and England as soon as the dust problem became acute. By the use of this machinery the time required for completing the treatment of an old road has been enormously reduced, and the quantity of coal tar has been cut in halves at the same time as the quality of the work has been materially improved. Pneumatic spray nozzles have made it possible to dispense with the heating of the tar and to gain, besides, a greater penetration of the roadbed and a more complete filling of the interstices. But here the old method of heating and spreading by brooms has prevailed, while improved methods and economy with materials have been restricted to new construction conducted by private corporations, nowise interested in teaching economy to aldermen, road supervisors or the public in general. The use of the pneumatic nozzle has also led to experiments elsewhere—in France—intended to secure a greater compactness of the crushed stone bed, so that the tar would have less space to fill and would be lodged more securely, as well as binding the stones more securely, and it seems from recent reports that these new methods give improved results, besides greatly economizing on the coal tar or its substitutes. Apparently, certain possibilities are in sight for economizing on the dustproofing materials still further, as by experimenting with small, pentagon-faced, dodecahedron-shaped brick, which, if small enough, may be packed almost solid, and would require a very small quantity of tar for completely filling all interstices.

Even more farfetched experiments, as with corn husks or other vegetable fiber for arresting and holding dustproofing materials, especially those of lesser natural binding qualities than possessed by good refined coal tar, from being washed away by rain or penetrating to an unnecessary depth, would be in order under the condition of a threatened scarcity of materials which may at almost any time obtain. In England, the mixing of "creosote-oil" with resin or tallow proved of no lasting value, but experiments of a similar nature are conducted in many places, where dustless roads are much desired, while considerations of economy are imperative.

As in the rubber industry it has been found necessary and useful to experiment industriously with admixtures to the pure rubber, so does the dustless road problem portend an era of attempted admixtures with coal tar and other tars, some of which may eventually prove wholly suitable.

It is now believed to have been shown that the conclusions of engineers on the subject of dustproofing methods cannot alone be made the foundation for dustproofing projects and work. They are too uncompromising for the complex situation and by no means final. On the other hand, there is no other foundation for intelligent decisions. They represent, in extract, a full technical knowledge of all which has been done, and to this must be coupled an equal knowledge of local conditions and a goodly amount of sturdy business sense. Suitable steps for rendering all technical knowledge on the subject, so far as it goes, accessible and directly applicable to any given case, have never been taken. Some of it is recorded in libraries and periodicals, for those who have the time and patience to dig it out in each instance, from a hundred scattered and disconnected accounts, but the most recent, most valuable and most detailed portions of this knowledge are lodged in the minds of a considerable number of engineers, road builders and municipal officers, who cannot be brought together or otherwise consulted when a decision has to be reached. The first step in the desired direction must consist, it seems, in devising a form upon which the main and leading items of the provisionally established data may be entered in such juxtaposition that it may be shown at a glance where they are incomplete, and what relations each possible process for dustproofing bears to each possible condition of any road project which may come under consideration, the principal relations being those referring to comparative costs and comparative merits, including first cost, durability and degree of dustproofing. If maintenance cost is understood to mean the cost of a maintenance so thorough as to keep the road constantly as good as new, durability is included therein. The higher the maintenance cost, the less the durability.

Such a form, when complete, must be large and elaborate, considerably larger than any which may be practically shown on one page of this journal. A tabular outline for such a form is illustrated, however, in the framework schedule presented herewith, which may be expanded by addition and subdivision as much as necessary.

By extending the horizontal list it may take as many types of finished, old or new-built, roads, as fairly represent the varieties actually existing or which have a right to exist, some of which are dustproof, by virtue of their original construction; and pavements for cities and suburbs may be included.

By extending the vertical list, every method of dustproofing may be included which is applicable to one variety of finished road or another, only those methods being excluded which have

already been shown unfit at any cost or plainly less economical for every variety of road than some other method which produces equal or better results. An emulsion, for example, which may have been shown to disappear from the road surface in a week and costs as much as one which lasts a month, has plainly no claim to entry. Water sprinkling as a means for abating dust would have no claim to entry, except for being so commonly used.

While a "Normal Road Schedule" of this kind would in itself be very useful at present if compiled on the best judgment of the most knowing, even though the work be done hastily, and while it seems advisable that the work should be done first in just such a rough and ready manner, but fairly complete in scope, its full utility could probably not be realized, until it were accompanied with a "Normal Road Book" giving definitions or explanations of the most approved method of construction for each variety of road listed on the "Schedule," with definite statements of the quantities and cost of each kind of materials and each kind of labor involved in the prescribed construction. That the cost would be an arbitrary, local or average cost, would not matter, so long as the quantities involved in each cost item were given, and no bewildering digressions were made to explain discrepancies which the individual road builder should be able to take care of without special directions. The exact methods for dustproofing each type of road should probably not be given in the "Book," but be left open to be decided by the development of the art at any given time, with the latest information incorporated in the "Schedule," subject to correction from time to time.

On the completed "Normal Road Schedule" the cost figures would be those based on costs of materials and labor as given in the "Book," and in any given instance of consulting the schedule, the figures would be modified in accordance with local prices and the specifications of quantities given in the book.

After the first rough work is done, a commission of experts, covering in their knowledge a wide diversity of conditions, may, of course, be necessary, in order to have the specifications of construction in the book as authoritative as possible, and each set of these specifications should be accompanied with a statement of the machinery required for the economical performance of the work. As there can be no object served in catering to uneconomical construction methods, but rather in encouraging the formation of local corporations which will be equipped to do the work in accordance with best practice, the commission should arrive at a definite conclusion on the exact methods considered preferable for each type of road; all leeway and concessions to local conditions being expressed in having both the schedule and the book embrace types of road and materials for their construction, which are not in themselves technically preferable. In other words, the variety of types should represent the variety of local conditions, but the figures of book and schedule should represent the height of technical insight in getting the best engineering results from available materials.

The accompanying sketch of a schedule has been filled with figures representing only the cursory surmises of the writer, based on an insufficient number of facts, but they will serve to illustrate how a complete and authoritative schedule may be used. For example, a municipality has a macadam road faced with hard limestone and desires to make it dustless. By following the vertical from B3, it is seen that several dustproofing methods are available, but that method V is most economical for trial, while method I gives more complete results, protecting against the dust from a long-frozen road as well as against that of the hot summer time, and is in the end also more economical. But, if the road were faced with soft limestone, the schedule would give a somewhat different answer. Showing a higher cost for the oiling method, it would raise the question of the reason for this difference, and inquiry would bring it out. In a comparison among methods II, IV and V, which come close together in cost for one full year, the decisive element might be that II and V require frequent treatments and the ownership of an outfit, while IV may be more readily done under contract and gives results for the whole year. In other cases, the results of comparisons are more surprising, and true and correct figures on the schedule would no doubt make them highly interesting.

The figures given under the tarring process in the accom-

(*Continued on Page 861.*)

OUTLINE FOR "NORMAL SCHEDULE" RELATING TO DUSTLESS ROADS

			A—Dirt				B—Macadam				C—Bitulithic McA.		D—Tarred McA.		E—Brick	
			1 Clay	2 Gravel	3 Soil	4 Br'k'n Stone	1 Trap 8"	2 Trap 4"	3 Hard Lim'st	4 Soft Lim'st	1 Trap	2 Soft Stone	1 Trap	2 Soft Stone	1 Vitrified	2 Ord.
First cost per mile			1,000	1,500	300	3,000	6,000	4,500	5,000	3,000	9,000	7,000	6,600	3,600	13,500	10,000
Maintenance, as new, per year per mile			750	600	100	500	250	400	350	700	100	250	250	400	200	500
Annual cost per mile when paid by 4% loan, maturing in 20 years			793	671	114	650	559	629	606	848	567	611	590	582	900	1,014
Dust rating, 100–0			50	70	80	60	50	50	70	100	10	15	5	10	30	40
Road troubles and traction resistance, 100–0			80	80	100	30	0	10	5	20	0	10	0	10	20	20
Processes for Reducing Wear and Dust, Cost of Dustless Roads	I—Oil	Preparation of road	5,000	1,000	300	100	100	100	100	200	.....	.....	.....	.....	No	No
		Treatment per year—mile	200	250	250	200	200	250	200	300	.....	.....	.....	.....	No	No
		Road maintenance reduced to	100	300	100	300	150	250	150	300	.....	.....	.....	.....	No	No
		Annual cost, 20 years	556	595	361	499	351	499	351	603	.....	.....	.....	.....	.....	.....
		Same, including first cost	608	673	377	655	663	733	611	759	.....	.....	.....	.....	.....	.....
	II—Emulsion**	Preparation of road	No	No	200	100	100	100	100	100	.....	.....	.....	.....	No	No
		Treatment per year—mile	No	500	500	450	300	300	400	500	.....	.....	.....	.....	200	250
		Road maintenance reduced to	No	400	100	350	150	300	150	400	.....	.....	.....	.....	No	No
		Annual cost, 20 years	.....	884	603	796	450	598	549	894	.....	.....	.....	.....	.....	.....
		Same, including first cost	.....	962	619	952	762	832	809	1,050	.....	.....	.....	.....	.....	.....
	*III—Water Sprinkling	Treatment per year—mile	350	400	400	450	450	450	450	600	.....	.....	.....	.....	200	250
		Road maintenance increased to	1,000	800	250	750	300	600	450	800	.....	.....	.....	.....	No	No
		Annual cost, 20 years	1,334	1,186	642	1,186	741	1,037	889	1,383	.....	.....	.....	.....	198	247
		Same, with first cost	1,386	1,264	658	1,342	1,053	1,271	1,149	1,539	.....	.....	.....	.....	900	767
	IV—Tarring	Preparation of road	No	No	No	500	200	200	200	300	.....	.....	.....	.....	No	No
		Treatment per year—mile	No	No	No	300	600	300	400	500	.....	.....	.....	.....	No	No
		Road Maintenance reduced to	No	No	No	200	250	300	250	400	.....	.....	.....	.....	No	No
		Annual cost, 20 years	.....	.....	.....	520	850	603	653	905	.....	.....	.....	.....	.....	.....
		Same, including first cost	.....	.....	.....	676	1,162	837	913	1,061	.....	.....	.....	.....	.....	.....
	**V—Calcium Chloride	Preparation of road	No	No	No	No	No	No	No	No	.....	.....	.....	.....	No	No
		Treatment per year—mile	No	330	330	300	250	250	275	330	.....	.....	.....	.....	250	300
		Road maintenance reduced to	No	600	100	500	250	400	350	700	.....	.....	.....	.....	200	500
		Annual cost, 20 years	.....	919	425	790	494	642	618	1,018	.....	.....	.....	.....	445	790
		Same, including first cost	.....	997	441	946	806	876	878	1,174	.....	.....	.....	.....	1,147	1,310

*Dustless only 6 hours per day for 5 months of the year.
**Dustless only 5 to 6 months of year.
Excavation and drainage not included. Maintenance estimated for 500 vehicles per day.
Normal road width, 16 feet. 1 mile-9,387 square yards.

Aeronautic Progress Along Constructive Lines

By MARIUS C. KRARUP

(*Continued from last week*)

weighty parts resting on the main structure, including passengers, forward or backward. An adjustment requiring final decision in the building of the machine consists in placing the tilt-rudder nearly in line with the forces of propulsion and momentum, and there seems to be an unsolved problem in the placing of a tilt-rudder where it will act substantially the same manner whether the propellers are in operation or have been stopped. With a motor suddenly stalled while the machine is going at high speed, a tendency to swinging the machine around the tilt-rudder is observed, when the center of gravity is much lower than the propeller shaft, the latter being in line with the sum of normal air resistance against propulsion, while the momentum of the machine acts through the center of gravity.

This consideration has been used as an argument in favor of the monoplane and rear tilt-control, on the ground that the single plane, with its relatively large horizontal extension, offers a greater resistance against the turning moment referred to than the two planes, of which the lower would be in the path of the upper.

Of greater actual interest is the function of the tilt-rudder for assisting in leaving the ground. Most biplanes built by amateurs show it to be a common impression that the tilt-rudder should be used for this purpose, for the tilt of the main planes, as the machine stands on the ground, is usually insufficient for lifting the machine at the relatively small speed at which it is desirable that it should be driven while in contact with solids and exposed to bumps against inequalities of the ground surface. The start of such a machine leads frequently to an abortive series of hops, while the machine whose planes are set at an angle such as ten degrees with the base line of wheels or skids, leaves the ground without any use of the tilt-rudder, as soon as a moderate speed is attained, saving the machine many shocks calling for a strength, as a ground vehicle, for which there is no further use after the machine gets into the air. On the testing grounds of aviators, machines of insufficient tilt are also seen rearing on their hind wheels when the tilt rudder is applied too early, and this does not only subject the structure to special strains, but immediately retards it by the increased resistance to propulsion at the abnormally high tilt of the planes, and the retardation causes it to fall down upon its front wheels again. The same action causes the short hops and bounds. The best construction calls for a high starting tilt and motor power sufficient to produce speed quickly in spite of the additional resistance caused by such high tilt.

A mechanical element in aeroplane construction which is seldom considered as coming within the scope of the designer, is suggested through the use of the term "aviator's luck." In the trying out of machines many have fallen from considerable heights, but relatively few have been seriously injured, and this has been ascribed to "aviator's luck." Something more is involved. The seat of the operator is usually so arranged that, in whatever position the machine falls through the air, a more or less frail framework is interposed between the aviator and the ground, and the breaking of this framework protects the man against the full violence of the impact. By suitable handholds and some calculation of the strength of the materials which are to break, as well as some consideration of their forms, so that the aviator shall not be likely to break bones against this material itself, the aviator's risk of mortal injury could, according to all physical laws, be still further reduced.

A consistent development of the aeroplane's natural qualities as a parachute, which have always been kept in view by designers, may also be depended upon to minimize the risks of aviation. It should not be possible for the machine to submit to the laws of gravitation without its large surfaces taking an approximately horizontal position, either automatically or by a very facile control movement. The tendency of the heaviest parts to seek the earth with maximum speed, leaving the parts exposed to relatively greater air resistance to trail behind, should be enlisted to forestall any edgewise or endwise precipitation of the machine, as has already been done in a newcomer among French biplanes. The advantage of the dihedral angle of some monoplanes, as an element tending to impart staunchness, has here been borrowed without accompanying it with a tail nullifying the safety gained.

According to testimony given in court proceedings, the method of steering a biplane of the Wright type consists now in first turning the outer wing to a higher tilt, so as to raise its level, and a moment thereafter turning it back to less than its former tilt and increasing the tilt of the inner wing, simultaneously with turning the vertical rudder inwardly, as a ship's rudder is turned. With other biplanes, the aviator considers it necessary in some cases to shut off the power, before he applies the steering apparatus.

The first method takes cognizance of the momentum of the machine. The other is intended to eliminate the surplus speed in which momentum finds expression. If the outer wing were not first given higher tilt, the first effect would be to cant the machine to the wrong side, because the momentum would raise the inner side despite the rudder action before the latter could cause any notable decrease in speed on that side; it being understood that an increase of tilt without increase of propulsion increases the lift and reduces the speed, but also that the momentum, being an accumulated force depending largely on the weight of the machine, is less influenced by a control-change than the lift, which is a constant, so long as the machine is held to a horizontal course. Much depends on the areas of the tiller and the twisted wing tips. It is especially when a sharp turn is wanted, and the speed of the machine is high, that the preliminary increase of tilt on the outside of the curve is desirable. It produces a course as in Fig. 1A, while Fig. 1B shows that a machine 40 feet wide along the front edge, in order to be turned around and take an opposite course within 60 feet of its previous course, must be managed so as to give the outer wing tip five times the speed of the inner wing tip. And to effect this change in relative speeds of different portions of the machine, in a very short time, is a matter which tries the balance of the machine severely at the present stage of aeroplane design.

With regard to the canting of the machine—inwardly as a bicycle—it is not quite so clear on second thought why it should be necessary, as it seems at first impression. The mind untrained in aviation usually freely assumes that such canting plays the same part in offsetting the centrifugal force, as it does in a bicycle. But that which happens so easily at a slippery turn of the road when a bicycle is canted in the usual way, shows at once that canting in the air, which is very much more slippery than any road, while it may serve equilibrium, does not do so for the usual reason, the latter applying only where ground contact and friction afford a fulcrum, against which the resultatnt of gravitation and centrifugality can spend its force.

The centrifugal energy acts horizontally through the center of gravity, and the resistance it must overcome in order to drive the machine out of its intended circular course, at a turn, is the air resistance against sideways motion. In a biplane, the center of gravity *c*, Fig. 2A, is usually slightly lower than the sum of these air resistances *r*, and the centrifugal force itself has therefore a tendency to produce canting. If the machine could easily turn around its axis, this tendency would be sure to take effect, but in such a turning movement it is impossible.

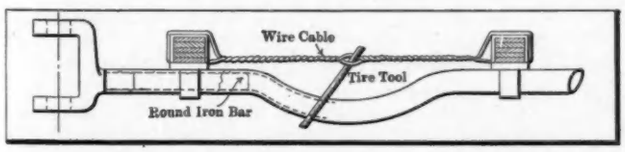
(*To be continued*)

Helpful Hints for Those Who Drive

AMATEURS should seize every possible opportunity to learn about the mechanism of the car they are driving, or learning to drive, and one way to do this is to gather all that can be gathered from the unfortunate experience. By learning to make roadside repairs expeditiously, and in such a manner as to allow the car to limp home, the new driver soon gains confidence in his own ability and this is reflected in his work at the wheel. So, it is a wise plan to visit all the repair shops possible, there to learn how repairs have been and are being made. More than this, it is well to talk about these things with more experienced drivers.

Thus, many an amateur has had trouble with punctured floats or carbureters, particularly with metal floats, for they are the only kind that can be punctured. As a temporary method of repairing a punctured copper float, the use of sealing wax may be cited. In cases where the float has flooded, through the perforation of the solder, the first thing to be done is to bore a small hole in the float, in order to let out the accumulated liquid, and the surface should be carefully cleaned round the puncture. A piece of sealing wax should then be obtained, and a few drops should be melted over the hole, and should be pressed well down, in order to fill it up. It will then be found that the float is again good for any number of miles. One advantage of this method is that the wax adds little weight to the float. It is advisable to moisten whatever is used for pressing in the melted wax, in order to prevent its sticking.

Nothing can give a new driver more trouble than a broken axle, particularly a broken front axle. If this be of the tubular type and the driver be fairly ingenious, a roadside repair may be made which will allow of driving the car home, which is some satisfaction. Thus, a case in which the tubular axle has broken off close to the spring chair, but inside of it may be repaired as follows: Obtain a piece of wire cable, or heavy telegraph wire may be used, or even in default of either of these a piece of stout rope. In any case, something which can be used to tie the two parts of the broken axle together. Attach this to the springs, leaving lots of slack between them. Then drive into the broken end a piece of wood, which has been whittled down to fit, or a round iron bar, or something similar and handy. Having driven this into one broken piece, drive the other onto it, and then keep them from separating by tightening up on the rope or cable. This may be done by inserting any strong stick, or piece of iron, as for instant a tire iron, and

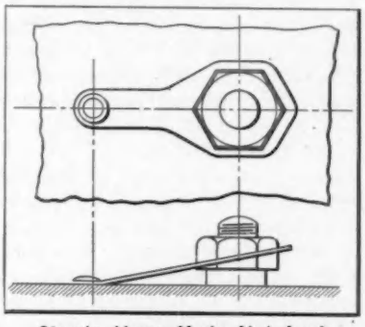


Method of Repairing Broken Tubular Front Axle

twisting until the whole is as tight as possible. Then, the tightening means should be so fixed in position as to render it impossible for it to come loose. It will then be possible to limp home with the broken axle, slow speed being a necessity.

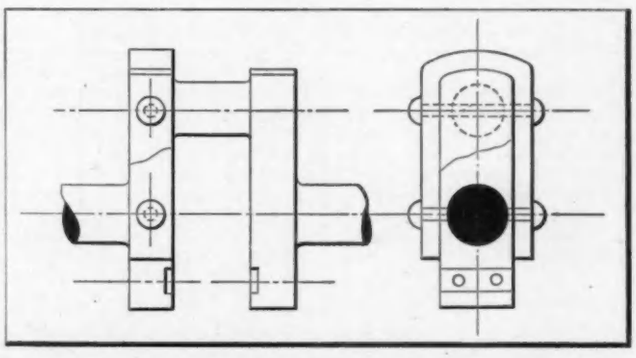
Lamps should have not a little attention whether in use or not, for sooner or later they will come into use, and then the previous neglect will manifest itself. One thing every automobilist should learn is not to fiddle around with the wicks of his lamps. Thus, they should be left as they stand when the lamp is extinguished. The average motorist extinguishes his oil lamps by turning down the wick, in order to save the clips of the lamp-door from becoming slack by frequent usage. He leaves the wick turned down till the lamp is next required, and then forgets which way to revolve the button, with the result that he frequently turns the wick right down into the oil reservoir and has sooner or later to fish for it in the dark with a bent pin. Moral: If you extinguish a lamp by turning down the wick, turn it up again before you quit hold, so that you may never forget which way to revolve the button. The best way, however, to extinguish the lamp is to open the door and blow out the light, as that leaves the wick right for the next time of lighting.

One little subject which always gives trouble is the matter of nuts working loose, so that nut locks are a necessity. A simple form which every automobilist having a hammer, cold chisel, some sheet steel, and a little patience can make for himself is that shown in the accompanying cut. A short piece of sheet steel is on a block of hard wood, and a hole punched through one end, this being a round hole to accommodate a screw or rivet. At the other end, the nut for which the lock is to be made is laid on the steel and its exterior shape scribed on the steel, using any sharp point, as the end of a file. This outline serves as a guide for the cold chisel which is brought into use to cut away the metal. The cut shows one which was made forming a full hole around the nut, but if the work is carefully done, this is just as effective when the three sides only are done, the outer end being left open. When the end has been formed to fit the nut, one end is put in a vise, and the other end bent, to give the whole something of a spring. To use, the small end with the round hole is fastened down, by means of a rivet or screw, according to the kind of a job wanted, which, in turn will depend upon its location, and the party doing the work. This end being fastened down, the other will stand up at a slight angle. To screw the nut down, this must be held up above the top of the nut, out of the way, but as soon as the nut has been screwed home the lock can be dropped down over it, preventing it from backing off.



Simple Home-Made Nut Lock

Crankshafts will break at times, and the amateur should not start out with the idea that they will not, nor, more to the point, that they cannot be repaired. This particular repair is concerned with a shaft which breaks off in the cheeks or flat part. To repair, the nearest blacksmith makes a flat strop making it over one of the good parts of the shaft. Then with this flat strap over the broken parts, a couple of holes are drilled through and pins, bolts, or rivets put through.



Showing How a Crankshaft May Be Temporarily Fixed

Three-Point Suspension Explained

Editor The AUTOMOBILE:

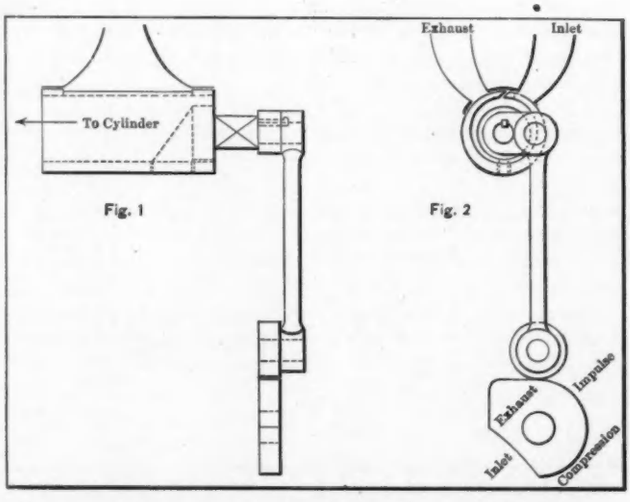
[2,248]—Will you please explain what is meant by a car being better because of a three-point suspension? I overheard the above statement relative to a certain car, and would like to know what it means. A CONSTANT READER.

Providence, R. I.

By three-point suspension is meant the hanging or fastening of some one or more parts of an automobile by three points only, instead of the more usual four, six, or more. In hanging an engine from three points for instance, this may be one in front and two at the rear end, or two in front and one at the rear. In actual practice, however, the former method is followed more often than the latter. The same, of course, applies to transmissions, and other parts as well as to engines.

The advantage of this form of suspension lies in the fact that at times one road wheel rises higher than the other by an appreciable amount, or sometimes both wheels on one side rise quite a little distance above those on the other side. This naturally twists and thus strains the chassis frame. The latter has, however, some slight freedom, but if the engine is rigidly bolted to a subframe by four or six points, when one side rises above the other, or when one side of the frame is twisted, the result is to twist the supporting arms of the engine. This may easily result in a breakage of the same. With the three point suspension, on the other hand, the single point is pivoted and the whole thing may turn on that point. This allows the plane of the two-point-supported-end to twist out of the former plane, but carrying the engine with it as a whole, and consequently doing no damage whatever. There are other supposed advantages of this form of suspension, but this is the principal one. In some form or another, nearly every manufacturer uses the three-point suspension.

That is to say, the three-point suspension for some one or more parts is used by many manufacturers, who do not make much of it in their advertising or other literature, but the fact remains that the suspension is a true three-point one, nevertheless. This would explain the apparently small number using it.



Drawing to Show Action of Irwin Type of Valve

Can't Find the Misfire

Editor The AUTOMOBILE:

[2,249]—I am repairing a Buick, Model F (1909) double cylinder opposed engine, and am having trouble with the rear cylinder missing fire. When it misses fire, the vibrator does not vibrate. I have changed spark plugs, but that does no good, the miss is about the same on high and low speeds. I have tried all kinds of adjustment of the vibrator, but nothing seems to do any good. Please give the cause of the misfiring and how to cure it through "Letters Interesting, Answered and Discussed." H. L. RICE.

Chilhowee, Mo.

There may be many causes for a misfire, among which may be the weakness of or stiffness of the vibrator spring on your coil. This is not usually counted in as one of the causes, but since you speak of the vibrators, we mention it. If the spring is too weak, the current will hold the vibrator down at all times, so that no spark will jump in that cylinder, while if the spring is too strong, the current will not be able to draw it down, with the result again, that no spark will occur. It would be well to try new and different vibrators, before experimenting with any thing else. The causes of missing are so many, and the things mentioned are so few, that it is hard to even estimate what the source of trouble may be. Broken wires, defective coil, loose wires at a binding post, worn out cells, water in the gasoline, spark out of time, water in the coil, and many other things may be the cause of the trouble.

Wants a Self-Starting Device

Editor The AUTOMOBILE:

[2,250]—Do you know of any one making an efficient self-starter for automobiles? I have a 50-horsepower 4-cylinder roadster of 5 3-8-inch bore and 5 1-2-inch stroke. Have just undergone an operation, as a result of which the doctor has forbidden me to crank a car for at least a year. If you can give me the address of any of the above parties, I will consider it a great favor. Expense of installation is no object if I can get what I want.

Stafford, Conn. CLAUDE PINNEY.

Self-starters have not progressed very far, and the best that can be done is to give the address of makers of devices for this work. Any one desiring a starting device can then write to these makers and obtain their estimate of the value of the various devices, as well as an estimate of the expense of attaching. Among those who make and sell a starting device, the following may be mentioned:

Auto Improvement Company, 302 Hudson street, New York City; Automatic Starter Company, 1512 Michigan avenue, Chicago; Gardner Engine Starter Company, Michigan avenue, Chicago; W. H. Herbert, 3312 Wabash avenue, Chicago; Monarch Motor Mfg. Co., 3145 N. Halstead street, Chicago; Starter Mfg. Co., Houseman Bldg., Grand Rapids, Mich.

Another New Type of Valve

Editor The AUTOMOBILE:

[2,251]—To the many interested in the development of the slide valve, and other substitutes for the poppet type of valve, the one shown in the accompanying figure may be of interest. In this, Fig. 1 shows a side view of the valve and its driving mechanism, while Fig. 2 is an end view. Both views show the relative ports in the valve chamber. No method of connecting a returning spring or dash pot is shown, but something of this sort is a necessity. The bore of the valve opens into header or passageway leading to the cylinders. The exhaust is delivered directly into the exhaust pipe, and the charge is taken directly from the inlet passage so no auxiliary valves are required.

Bradford, Pa. G. W. IRWIN.

The design appears to have much merit, and to be worthy of some further study. Thus, if the cam arrangement were used, a guide of some sort would have to be used, else the cam would throw the arm to one side at the first rising of the exhaust part, the device then being inoperable. Granting a guide, and a spring or dash pot for the return, the device might not be so simple as it seems in the sketch. The idea, however, of a narrow though very long opening into a large diameter circular passage communicating with the combustion chamber, is a very good one.

More About Bissell Helicopter

Editor THE AUTOMOBILE:

[2,252]—In your issue of March 3, I notice a letter from J. U. Baker which is in criticism of my "flyer." Why, if the propeller cannot work well as shown, can't the rim be made of some light material, such as wood or aluminum? A wood pulley 18 inches in diameter will not burst at over 4,000 r. p. m., and then, if the engine is geared (like some of the French engines are made) to run at say 1,200 revolutions for 400 of the helicopter, it seems to me the desired result can be obtained. To overcome the torque he speaks of, it is only necessary to turn the steering handle to th right or left according to prevailing conditions. The whole business with man and 10 gallons of gasoline would not weigh over 450 pounds, and they guarantee a six-foot, two-blade propeller at the above rate of speed to pull 200 pounds, so I should think at a rough guess the above figures are approximately correct. JOS. E. BISSELL.

Pittsburgh.

Unfortunately, it is impossible to have light weight and flywheel capacity at one and the same time, so if the device depends upon the flywheel ability of the rotating weight, as incorporated in the rim of the so-called gyroscope, it will be impossible to have light weight, that is, for the purpose, the materials mentioned cannot be used. As far as the figures given are concerned, it is impossible to verify any such figure as given, namely 4,000 r. p. m. for an 18-inch diameter wheel. This would give a surface speed of 18,840 feet per minute, which is far beyond the ability of glued wood (as all wood pulleys are made up) to withstand. Kent gives the following formula for the strain per square inch of sectional area in flywheels of wood:

$$S_1 = .00000225\ V^2$$

in which S_1 is the strain per square inch of sectional area for wood and V is the surface velocity in feet per minute. This, as just found, is approximately 19,000 feet per minute, so substituting its value, we get 812.25 pounds per square inch. Wood will not stand such a strain.

Torque cannot be overcome by turning the steering wheel to the right or left, as per Mr. Bissell's naive suggestion, for torque is a positive and definite force, and the simple movement of a wheel would neither add to nor subtract from its amount, action, or direction of action.

Counterboring of Engine Cylinders

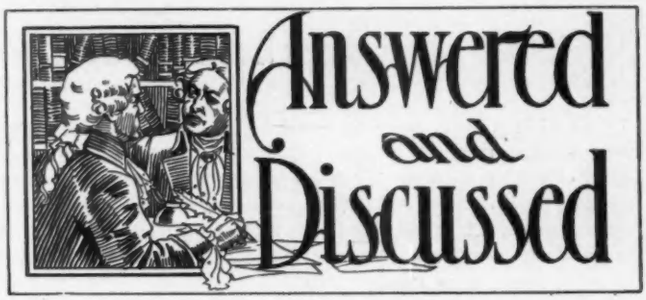
Editor THE AUTOMOBILE:

[2,253]—Will you please tell me in your columns of "Letters Interesting, Answered and Discussed" about the following matter: Which is it, if any, of the automobile manufacturers that have a counterbore in the ends of their cylinders, and why is it that all of the high grade makes do not have it, as it is in all high grade steam engines, for there must certainly be some wear on the cylinder walls, where the piston and piston rings travel? I have spent part of my life amounting to about 20 years operating steam engines and similar machines, and in every case where the cylinders had no counterbore, the same would give trouble after they were used some length of time. W. S. REED.

Smyrna, Kent County, Del.

The writer of the above letter must be misinformed, for the great majority of gasoline engine and automobile manufacturers have the cylinders so cast that there is a natural counterbore formed at the upper end; either that, or the counterbore is machined in the casting. If this were not so, it would be impossible to machine the inside of the cylinders, as they are machined with a boring mill and an inserted blade cutter, or something on that order. In case no counterbore were left in the casting, the boring would not stop at the right point, and the piston in its travel would be likely to strike the unfinished part, causing trouble.

Moreover, were there no counterbore, the grinding process by means of which the cylinders are finished would bring out more trouble, for the grinding wheel, which is somewhat brittle in that direction, would break when the side of it struck the top of the bored part. Even of greater value than this is the matter of proper combustion chamber volume. If the cylinder diameter were not enlarged at the top, the length necessary to give the proper compression space would be excessive, resulting in very high cylinders.



Four-Speed Gear with Two Direct Drives

Editor The AUTOMOBILE:

[2,254]—In several of the show issues of "The Automobile" there appeared an advertisement of a car, the "Keystone Six-Sixty," made by the Munch Motor Car Company, Yonkers, N. Y. Therein was mentioned that the transmission affords four speeds forward, with direct on the third and fourth, a feature which no other American shaft-drive car has. Could you give a full description of this particular transmission mechanism? Could you also publish a description of the Mea high-tension magneto?

New York City. A SUBSCRIBER.

At this writing, no details of the particular transmission gear mentioned are at hand, although the idea of two direct drives is not new, having been shown on a Hotchkiss car over three years ago. Other makers have also experimented with it, but apparently none of them found it of sufficient worth, or at least, in sufficient demand to be worth adding to the car as a regular feature. The main idea of a direct drive is that of reducing noise, and to some extent, friction, on the speed likely to be most used. Some makers consider this the high speed, and make that direct, while many more consider the second of four speeds as the one most used, and make that the direct, high in that case being a geared-up speed for exceptionally fast work. There are in this country 22 makers now fitting cars with four-speed gear boxes, and the fact that but one of them all uses the double direct drive speaks volumes for it.

The Mea magneto has been described in the columns of THE AUTOMOBILE on two occasions, being mentioned in the Boston Show issue, dated March 10, also this magneto was described in another later issue.

Peculiar Action of Confined Gasoline

Editor The AUTOMOBILE:

[2,255]—Possibly the following would be good reading for those who read articles under "Letters Interesting and Instructive."

In talking to a friend of mine who has the greater part of his life worked with oils, acids, etc., I mentioned the fact that I had filled a bottle with gasoline and corked it up tight and placed it in a cool pantry, when I went for it an hour afterward the bottle was in a thousand pieces. This friend claims that it proves that the gasoline was doctored up with acid, otherwise it never would have acted this way. He claims that the gasoline dealers adulterate with acid in order to give it a higher test. He further claims the acid is very bad indeed for the engine. As a solution to test the gasoline for this acid he says that a few drops placed upon a varnished board and left for half an hour will show no bad effects upon the surface if the gasoline is free from acid, in fact, it brings out the color; on the other hand, if acid is present the surface will change color. Have any of your readers ever brought up this matter before and do you consider it a test worthy of investigation?

A cylinder jacket showing a crack four inches long through which only a drop of water seeps through every now and then, how can it be repaired? The crack is as fine as a hair and hardly think I could get "smooth on" or any other substance to penetrate the crack. The manufacturere advises me to get new cylinders, as brazing or pasting up the crack is money thrown away. What is your opinion? In case I fill the crack would you advise boring a hole at each end of the crack and putting in a bolt or screw to prevent it cracking any further. F. H. THOMPSON.

New York City.

The crack may be fixed, at least temporarily, by inserting in the water cooling system a solution, or powder, which will form a jelly or thick substance and fill up such small cracks as the one mentioned. One of these substances is called Sementol which is made by the Northwestern Chemical Company, Marietta, O.

In the Building of a Private Garage

EXPERIENCE must be taken advantage of in an undertaking such as this, and account must be taken of limited knowledge especially in view of the influence which public garages must necessarily have upon this phase of automobile undertaking. It is something of a question as to whether or not it pays to build and operate a private garage, if a public establishment of this character is located within a reasonable distance, provided it is run in accordance with the dictates of standard practice. It may cost from $25 to $35 per month to stable a first-class touring car in a public garage, and $300 to $400 per year seems to be a considerable sum to devote to this service.

In a public establishment, the monthly stipend pays for not only the housing of the automobile, but washing and polishing as well. In a private establishment, a car may fall into a low state of upkeep, if it is not promptly washed when it comes in off the road, or if it is improperly cleaned. In a private establishment, under the circumstances, while the monthly expenditure may be less than the figures given for the cost of stabling in a public garage, the fact remains that the cost of repainting

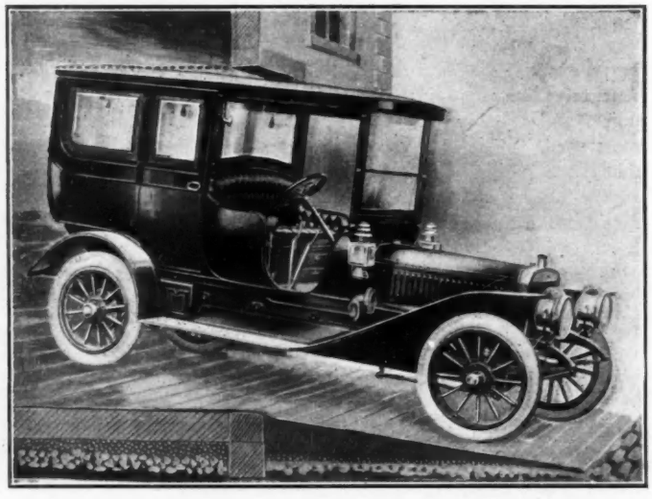


Fig. 1—Showing a limousine passing through the door with the front wheels on the runway and an incline such as will cause the back of the limousine to strike the top of the door framing

at the end of the year may wipe out the apparent saving, and the cost of replacing a disrupted cylinder might make heavy inroads besides.

When a car is placed in a private establishment, the facilities required for its proper maintenance must be provided, and unless the owner is fond of washing and cleaning the car, and is in a position to maintain the temperature of the garage above the freezing point throughout the winter season, he will have to cope with freezing troubles, which is a matter of removing the jacket water, or having to do with anti-freezing solutions, which latter products are not in the category of "all sunshine."

Simple Problem When Details Are Cared For

All the requirements in the maintenance of a car are simple, nor is there any mystery attached to the details involved, but the things to be done take on some of the characteristics which obtain in the maintenance of a horse; when feeding time comes, there is only one thing to do, that is, feed the horse. When an automobile comes in off the road, if it is besmeared with mud, it spells ruin to the finish on the body and the running gear, to defer the cleaning operation until morning. If it happens to be 10 o'clock on a raw night, after a 200-mile drive, it is highly improbable that the owner, if he acts as his own pilot, will accept the additional burden, which means that the automobile will be ruined if it is not cleaned.

If the owner is disinclined to give the automobile the attention it requires in service, one of two courses lies open to him. He may incur the extra cost of refinishing the car every few months, or he may engage and maintain a chauffeur. In the latter case, the cost of the private garage must include the salary and expenses of the chauffeur. If an owner elects to drive his own car, and desires to reduce the cost of maintenance to the lowest possible figure, the probabilities are that public garage service, if it is up to the standard, which is generally claimed for it, will compare favorably with the cost of a private establishment in the absence of a chauffeur, assuming, of course, that the owner will elect to retire for the night after he comes in off the road, rather than to stay up and clean the automobile.

All such problems will bow to common sense treatment, and a little investigation, and in all probability solution must be varied to suit the individual requirements, and the practical capabilities of the owner. In the planning of the structure, whether it is to hold a plurality of automobiles, or only one, the mere fact that the automobile to be stored therein is without a top, is not good reason for making the height of the door below that which will accommodate a limousine, and care should be exercised to have the door register with the greatest height likely to exist for any limousine type of automobile built. It is discommoding to discover that while the door is high enough to accommodate the owner's car, it will not let his friend's limousine in for temporary storage during a visit. In any case, the time must come when a car will cease to be valuable, and the new purchase may include an automobile with a top, when, if the door is not high enough, it is a little disconcerting and at some cost to prop up the structure, cut out for a new door, and have the new doors fitted to the enlarged opening.

Fig. 1 shows a condition which is brought about if the runway leading up to the door is a little steep, and if the height of the door gives bare clearance, measuring the body on the chassis in the vertical plane. When the front end of the car is tilted down, provided the wheel base is a little long, the back of the deck of the limousine will scrape against the door framing, with no good result to the car. This condition represents a practical

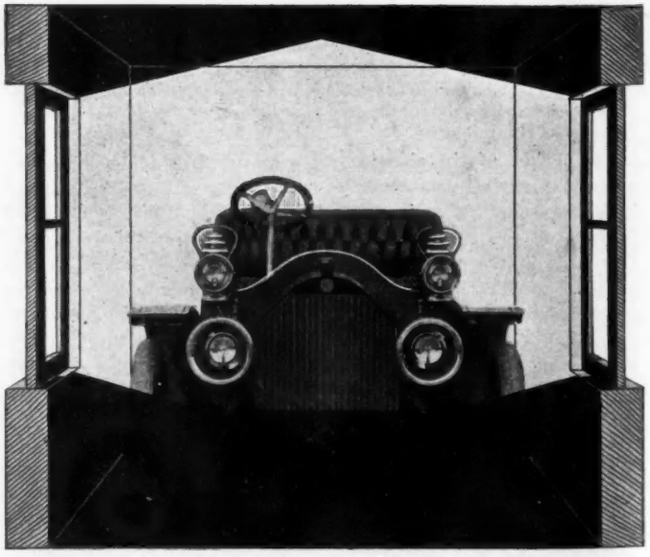


Fig. 2—Presents a narrow structure, with the windows the customary height, showing inefficient illumination with the machinery part in the darkness

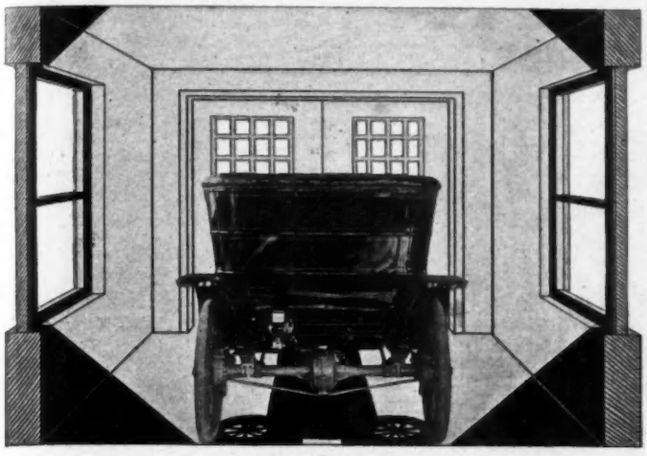


Fig. 3—The width of the building in proportion to the width of the car is such that the light strikes the floor outside of the line of the wheels with a good lighting effect

difficulty which was induced by the increasing length of wheel base in later day models of automobiles, whereas garages were built to accommodate earlier types of cars having a short wheelbase. This way of attacking the problem rather points to the futility of making the dimensions of the garage in bare conformity with the dimensions of the car. Liberal provision for a given type of automobile, while it represents very little by way of extra cost, takes care of the future, which, in view of the history of automobile designing, is the only safe thing to do.

Lighting Problems Influence Garage Dimensions

In congested districts, where space is at a premium, the owner who may have enough room for a one-car garage, is prone to limit the space to the barest necessity, and at first blush will reach the conclusion that a clearance on each side of the car, if it represents a comfortable passageway, is all that the occasion requires. As a dead-storage proposition, this is an excellent way of looking at it, but Fig. 2 is offered to show how the light from the windows, as they are usually placed, will fail to reach the vitals of the car, and will keep a large portion of the floor in utter darkness by contrast, so that if it is desired to examine the automobile, it will have to be run outside of the garage in order that the owner will be able to utilize daylight in the examination of the machinery, which, during inclement weather, is an undesirable act. In this kind of trouble, interior lighting whatever its character, aids very little, because of the shadows thrown.

By adding to the width of the building, provided the windows are to be the customary height from the floor, daylight may be utilized to better advantage. since it will strike the floor at a point outside of the line of the wheelbase of the car, as shown in Fig. 3, and, incidentally, more room will be found of advantage in many ways which do not appear upon the surface, even when a garage is being planned in the light of limited space, and perhaps with a view to limiting the expenditures as well. These lighting problems may be disposed of by taking advantage of artificial illumination, which adds to the cost of maintenance, and something of dangers, which will have to be recognized and treated according to their merits.

Artificial Illumination is a Necessary Evil

In case room is much restricted, the ill effect of a narrow space on each side of the automobile may be overcome by having the windows extend down to a point near the floor, as shown in Fig. 4. Another way to dispose of this angle of the situation would be to insert dead lights (the method of porthole lighting as used on ships) in the concrete work, having a row of these inserted lights built into the concrete all around within, say, 12 inches of the floor line. There is still another idea which is practiced to some extent in Germany, in which some of the blocks of concrete are displaced by blocks of transparent (glass) material.

While it is of the utmost importance to furnish windows and other means by which daylight may be taken advantage of to the maximum extent, primarily due to the fact that daylight is furnished free, also on account of the non-inflammable character of this sourse of light. Gasoline, as it is used for its fuel value in automobiles, is not at all dangerous when it is handled in accordance with its well-appreciated characteristics. The fact remains, however, that a very little liquid gasoline, if it is turned loose in a small enclosed room, becomes a source of danger in the presence of substantially every form of equipment used in the process of artificially illuminating. Substantially 2 per cent. of the weight of the air in a room represented by gasoline provides an explosive mixture, which is not only readily ignited, but sets free its energy with maximum force. In a small enclosure, it does not take a large amount of gasoline in liquid state to approach a condition of danger, and this will be particularly true if there are no outlets at the floor line, through which the vapor, as it forms, may spill out and float away on a current of air.

A Pit in the Floor Increases the Hazard

In former times when the working parts of automobiles were concealed under the deck of the body, and inaccessible, excepting by approaching from below, repair pits were much in vogue,

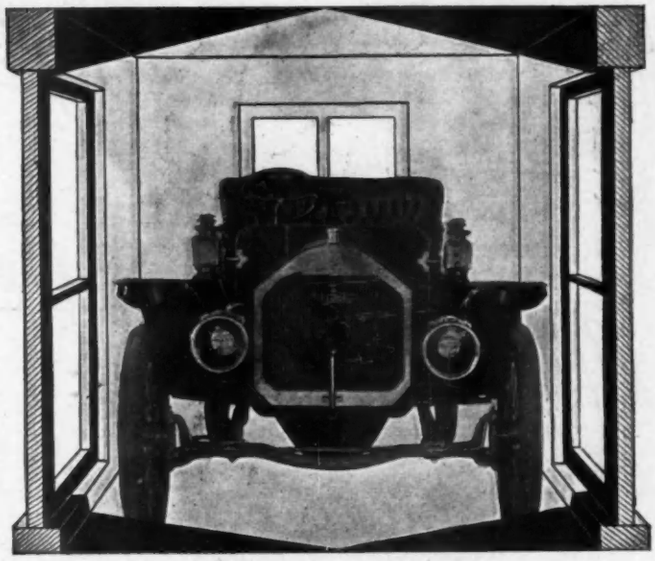
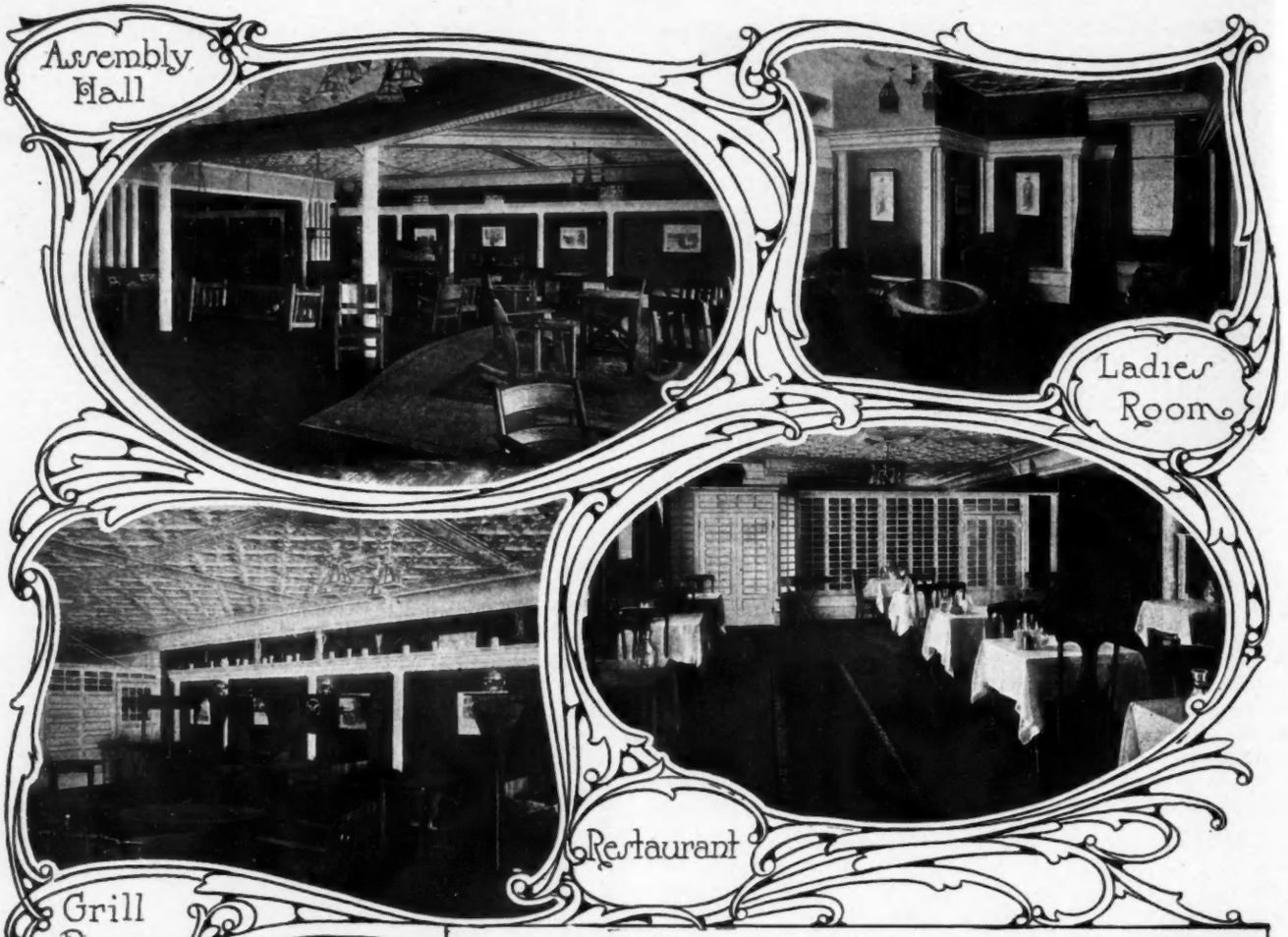


Fig 4—A narrow structure with the windows passing down almost to the floor line and lighting up the machinery portion of the automobile

and they offered a certain facility, although it is impossible to claim that a workman can do his best in a dark pit under a car. In view of the specific gravity of gasoline mixtures, the explosive products fall to the low levels, and a pit forms a pocket in which these explosive mixtures will accumulate, and a naked flame furnishes the missing link, following which a terrific explosion will be a normal expectation. Automobile construction, as it obtains for the most part, at the present time, is along lines which permit of getting at the working parts from above, and a pit becomes unnecessary if the automobile is properly made.

If a pit must be used, some means must be provided by which the accumulation of gasoline-tainted air will flow out from the bottom of the pit as fast as it may be formed, and it is highly improbable that a means may be readily at hand for the accomplishment of this necessary purpose, with sufficient certainty to make it desirable to plant a small garage in the vicinity of a dwelling house.

(To be continued.)



Long Island Automobile Club

TO those who have given the matter any degree of thought, the real purpose of an automobile club, its mission to motordom generally and the public at large, is beautifully exemplified in the work of the Long Island Automobile Club.

This organization is not a sporting club in the contracted meaning of the term; neither is it a map-maker and seller, and yet its influence in sport is far-reaching, and it has done a great work in making the highways of Long Island intelligible to automobile tourists, by its industry in placing signs.

Its real significance to motordom lies in its legislative activity, its social power and its service and convenience to those who avail themselves of its privileges. The club is almost ten years old, having been formed Nov. 27, 1900. It made a good start and soon swelled its roster to several hundred members. About a year ago it moved into its new quarters, situated at the gateway to Long Island, the plaza of Prospect Park, Brooklyn. It had about 400 members at that time, but now its rolls show that there are over 700, and before the last of this year a full 1,000 is predicted.

Historically, the club was the second organization in America formed in the interests of automobiling, and was the third to own its own clubhouse and garage. It has held and been identified with endurance runs, economy contests, race meets, tours and everything tending toward the uplift and development of motoring as a sport and pastime.

The club has three trophies for which the members contest annually, besides numerous prizes for the winners of races, runs and tours of various sorts. The three permanent cups are awarded as follows:

One handsome cup for the greatest mileage by a member during the year. In this contest the odometers are read May 1, and the owner of the car must be at the wheel in order to have the mileage count.

The second cup is presented to the owner of the car that tours through the largest number of States during the year.

The third cup is one presented by William Schimpf, but the conditions of its award have not yet been published.

In addition to these "annual" cups, the club each season puts on several runs based upon interesting conditions. The first of these for the present season will be the inter-club contest arranged between the Long Island Automobile Club and the Crescent Athletic Club, May 21 and 22. About a score have entered on each side, and the cars will be driven by active members of each organization. The system of penalization is mild. The total penalization of the contesting clubs will determine the winner.

The course of the run will be to Riverhead, via Easthampton and East Quogue, with check at the Long Island House. The return trip will be by way of Northport, and the total distance something under 250 miles. The trophy becomes the property of the club winning it twice.

While there is a strong probability that there will be some sort of a three-day run to end May 30, and another for July 4, the next event that is actually scheduled is the annual Orphans' Day outing, which will be given under club auspices June 7. This event is one of the most beautiful charities of its kind, and the interest in it is intense, not only from the viewpoint of the children, who look forward to the ride and the fun at Coney as the event of the year, but also by the members of the club who join to give the little ones a taste of real enjoyment. This year arrangements are being made to entertain 1,200 children and over 100 members.

At the Vanderbilt Cup race and other national events, the club provides its own pavilion for members, and assists them in every way to enjoy comfortably the big races.

The entertainment committee is one of the busiest organizations of the club. Twice a month there is "something doing" at the luxurious clubhouse. Two or three times a year the club indulges in "stag" affairs, but all its other social functions are open to the ladies. About once a month there is an able lecture delivered by some speaker of commanding knowledge of his subject. These affairs have proved very popular during the past year and have drawn large audiences. Aviation, ignition, mechanics, steel, rubber, law and motive power are some of the things that club members have heard discussed recently. Vaudeville is by no means unknown, and the lighter side of clublife is not neglected.

As a force exerted in the direction of reasonable law-making, the club shines. Every measure touching the interests of the automobile is scanned closely by the legal lights of the club, and the action taken to prevent imposition upon motorists is one of the refreshing things about its activities. Practically single-handed, the club has fought adverse legislation and unjust prosecution, and in a gratifying percentage of its undertakings it has been successful.

With regard to the pending Callan bill, the club has taken a strong position against certain clauses, and a series of compromises by which the original tenor of the bill has been modified to some extent, is claimed as an achievement for this organization.

The new clubhouse, a comfortable structure of modern architecture, is located at 920 Union street, within a stone's throw of the lordly entrance to Prospect Park. It is four stories above ground, with a basement, fully equipped for washing cars. The lot is 50 by 100 feet, thus giving the club 25,000 square feet of floor space. The club rooms are on the second floor and are

(*Continued on page* 861.)

Coming Events in the Automobiling World

June 20-July 6....Detroit, Mich., Industrial Exposition. Detroit Board of Commerce.
Jan. 7-14, 1911....New York City, Madison Square Garden, Eleventh Annual Show, Pleasure Car Division, Association of Licensed Automobile Manufacturers.
Jan. 17-24, 1911...New York City, Madison Square Garden, Eleventh Annual Show, Commercial Division, A. L. A. M.
Feb. 13-25, 1911...Chicago, Coliseum, Tenth Annual National Automobile Show, N. A. A. M.

Races, Hill-Climbs, Etc.

Apr. 30-May 2....Philadelphia Roadability Run to Atlantic City, Quaker City Motor Club.
May 5-7.....Atlanta, Ga., Track Races. Atlanta Automobile Association.
May 9-11.....Harrisburg, Pa., Fourth Annual Reliability Contest to Atlantic City and Return.
May 14.....Kansas City, Mo., Hill Climb, Automobile Club of Kansas City.
May 18-19.....Norristown, Pa., Third Annual Endurance Run, Norristown to Scranton and Return.
May 19-21.....Hartford, Conn., All-Connecticut Reliability Contest.
May 21-22.....Bay Ridge, L. I., Club's Endurance Contest Around Long Island, Crescent Athletic Club and Long Island Automobile Club.
May 21-22.....Track race meet, Memphis, Tenn., Homer C. George, Manager.
May 27, 28-30....Indianapolis, Ind., Automobile races, including championships events on motor speedway.
May 30.....Bridgeport, Conn., Hill-Climb up Sport Hill; Automobile Club of Bridgeport.
June 2.....New York City, N. Y., Trade Association, Orphans' Day Excursion to Coney Island and Return.
June 4.....Worcester, Mass., Fourth Annual Hill Climb, Dead Horse Hill.
June 11.....Wilkesbarre, Pa., Annual Hill-Climb up Giants' Despair, Wilkesbarre Automobile Club.
June 15.....Cincinnati, Seventh Annual National Reliability Run for Glidden Trophy, through the Southwest.
June 16-22.....Albany Automobile Club, Albany, N. Y., Sixth Annual Tour. To Atlantic City and Return.
July 4.....Indianapolis, Ind., Cobe Trophy Race. Held on Speedway Track, Chicago Automobile Club.
July 4.....Wildwood, Pa., North Wildwood Automobile Club, Race Meet and Club Run to Track.
July 30.....Wildwood, Pa., North Wildwood Automobile Club, Race Meet and Club Run to Track.
Sept. 5.....Wildwood, Pa., Speedway, Labor Day Race Meet of N. Wildwood A. C.
Sept.....Chicago Commercial Car Reliability Contest of Chicago Automobile Club.
Oct. 1.....Long Island Motor Parkway, Vanderbilt Cup Race, Wheatley and Massapequa Sweepstakes.
Oct. 8.....Philadelphia, Fairmount Park race. Quaker City Motor Club.
Oct. 15.....Long Island Motor Parkway, Grand Prize, Automobile Club of America.

Foreign Shows and Races

May 1-Oct. 1.....Vienna, Austria-Hungary, Automobile and Aviation Exposition.
May 25.....The American Cup," Argentina, Sociedad Sportiva Argentina, near Buenos Ayres.
May 28-June 9....St. Petersburg, Russia, Automobile Exhibition.
May 29.....Copa Catalunya, Voiturette Race of the Royal Automobile Club of Spain, near Barcelona.
June 2-8.....Prince Henry (German) Touring Competition.
June 13-18.....Scotland, Scottish Reliability Trials.
June 20.....French Voiturette Race.
June 21.....French Stock-Car Race.
June 22-July 5....Russian Touring Competition, St. Petersburg to Moscow; also Commercial Vehicle Trials.
June 27.....Speed Trials at Kiev, Russia.

THE AUTOMOBILE

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THE farmers control the destiny of the automobile in proportion as they influence legislation, and that it rests in good hands is shown by the 2,000,000 miles of good roads that now offer an invitation to autoists to try out the newer mode of transportation. The automobiles for which farmers are willing to make expenditures for good roads are the very kind of automobiles which will be of the greatest benefit to the farmers. Short-sighted individuals may reach the conclusion that farmers will confine their interest to farm-wagons; they fail to give the farmers credit for having acumen enough to know that the banker must be taken to the bank; the banker's wife to the department store; the miller to the mill, and the money spender to the place wherein he will be accommodated in proportion to his ability to pay.

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JUST now there is a decided tendency to invest money in the manufacture of commercial vehicles, and that this year will see the commercial output go up on a basis of at least five to one, is predicted. It has taken all these years to bring about a realization of the fact that it is in the commercial vehicle that the future of the industry lies; a future in relation to which all attempts at prediction fall short, due to the vastness of the industry as it is reflected by the preparation which is now being made. Mistakes, as they were made in the past, and as they retarded the growth of the commercial phase of the industry, will scarcely have any influence on the future; if a storekeeper is now reluctant to put his deliveries on a basis which is possible with commercial automobiles, he will have to go down in the wreck of his business.

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FROM now on, for the whole of the warm season, contests will attract the notice of the makers and the users of automobiles to a greater extent than ever before, and it is well for the industry that all contests for the year will be conducted in accord with the rules of the "Contest Board." Chairman S. M. Butler has the matter well in hand; the rules are better than they ever were before and the chances of having a car of no merit receive credit for what it is not capable of doing at all are sufficiently remote to be disregarded. The Contest Board is the creation of the honest makers of automobiles who desire to maintain a condition of glowing health in the industry and they prefer to put the whole matter in the hands of a board of control, under the guidance of a chairman who understands his business and is known for his competence to act for the best interests of the industry, rather than to go in for the old time squabble and unfair rulings.

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AFTER awhile, when the makers of automobiles have a chance to breath, it is believed that the question of standardization will be given far more thought than it has heretofore received. Perhaps the Society of Automobile Engineers will take the matter in hand. President H. E. Coffin is the right man in the right place and it is assured that he fully realizes the necessity of clearing up many of the questions of standardizing which now hamper makers of automobiles, especially as they relate to the procuring of material. As it is at the present time, certain of the materials used in the construction of automobiles are difficult to procure, merely because the sizes specified by the engineers who are responsible for designing are so numerous that the mills are compelled to fill orders after they are received rather than to stock up. Certain sizes, referring to the respective materials, are carried in stock, and it is believed that designers might find it convenient to specify just these sizes when making out lists of materials required, in which event the mills would be enabled to make quick deliveries, and, what is more to the point, work on stock orders during the slack season with a chance of lowering the cost.

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YEAR after year the automobile situation has had its serious phase as represented by pneumatic tires, and for a long time it was considered necessary to try to find some substitute for Sea Island cotton and Para rubber, on the ground that these materials would never prove satisfactory for the character of the work imposed upon them. Time has shown that our worries were attached to the wrong chariot; the real question is, how may the price be held down to a reasonable level in the face of a scarcity of both cotton of the desired grade and rubber of suitable qualities? This great question is about to receive the distinguished consideration of the Association of Licensed Automobile Manufacturers, and it no doubt has worried the tire makers more than a little.

S. A. E. Activity Along Broad Lines

ENGINEERING has been given an impetus by the coming of the automobile, which, from the point of view of history, was only equalled when the electrical art became the foundation for a great industry. The other day it was said that the automobile has moved up so that it stands as the fifth industry of the world; it might have been stated at the same time that engineers working along transportation lines, which were concentrated in the automobile, became responsible for what is now vying with the fourth industry of the world. In the commercial world, the prosaic and hard-working engineer finds himself at one time or another classified in a manner as follows:

MILESTONES ERECTED BY AUTOMOBILE ENGINEERS

Year 1887—(Press comment—A dangerous person has had the temerity to attach a gasoline motor to a carriage and attempt to do away with horses.)

Year 1900—Panhard car on Gordon-Bennett Course made the enormous distance of 351 miles in nine hours and nine minutes, which is an average speed of 38.1 miles per hour. (Press comment—Terrific speed most extraordinary proceeding; police regulations wholly inadequate.)

Year 1904—American driver Heath in Panhard on Vanderbilt track traveled 284.4 miles in 5 hours, 26 minutes, and 45 seconds, which is an average speed of 52.2 miles per hour. (Press comment—The automobile, while it has small chance to reach a basis of utility in a commercial way, offers wide opportunity to sports.)

Year 1905—Raggio in an Itala wins Florio Cup, making 313 miles in 4 hours, 46 minutes, and 47 seconds, which is an average speed of 65.5 miles per hour. (Press comment—Italians have the speed disorder, too.)

Year 1906—Szisz in a Renault for the Grand Prix in a contest spread out over two days, made 774 miles in 12 hours, 14 minutes, and 5 seconds, with an average speed of 63.4 miles per hour. (Press comment—It looks as if the automobile is improving somewhat; engineers are beginning to appreciate the necessity of the use of suitable materials.)

Year 1907—Nazarro in a Fiat wins in Grand Prix, making 478.3 miles in 6 hours, 45 minutes, and 33 seconds, which is an average speed of 70.6 miles per hour. (Press comment—Marvelous performance of Nazarro * * *)

Year 1908—Lautenschlager in a Mercedes wins in the Grand Prix, making 478.3 miles in 6 hours, 55 minutes, and 44 seconds, which is an average speed of 69.5 miles per hour. (Press comment—Automobile is going backward; performance of Lautenschlager below that of Nazarro who was the winner last year.)

Year 1909—Strang in Fiat makes flying mile in 37.71 seconds. (Press comment—Going so fast the question is, Would he be able to close his mouth if he opened it; must be terrific wind pressure; automobile engineers are now at the pinnacle of their success.)

Year 1910—Oldfield in Benz makes flying mile in 27.33 seconds. (Press comment—A very creditable performance.)

Year 1910—Value of automobile industry, according to Alfred Reeves, General Manager of the A. L. A. M., $485,000,000.

Year 1910—Machine tools devoted to the manufacture of automobiles in Detroit and vicinity only—$85,000,000.

Year 1910—Commercial phase of the automobile industry forging ahead at a rate to indicate that the value of commercials for the year will exceed $100,000,000.

Year 1910—Society of Automobile Engineers, which numbers among its membership a large proportion of the formost automobile engineers in America, has grown from its nominal position of some four years ago, to the point where it is regarded as the representative body of engineers devoted to the manufacture of automobiles.

Time Has Arrived for Prompt Action

In 1896 when the Society was first formed, and A. L. Riker was elected to the presidency, the whole situation was under the shadow of the Mechanical Branch of the A. L. A. M., and it was extremely difficult to induce the engineers of the respective companies to believe that there was room for an abstract society, in view of the promise of the Mechanical Branch. The first year, then, under the circumstances, represented very little by way of advance, and at the first annual meeting, which was held in the New Grand Hotel, New York, there was so little interest taken that the officers were held over so that Mr. Riker served in the capacity of hold-over president for the second year.

Along towards the end of the second year of the Society (1897) notwithstanding the fact that the Mechanical Branch was making itself felt in the industry, it was rendered apparent that engineers, under the direction of companies, as in the Mechanical Branch, are more or less handicapped, and the character of the information afforded through such an association is only available to the companies involved; morever, it is plain in the light of experience, that commercialism puts limitations upon the members. During Mr. Riker's second year, matters took on a more serious phase, and the membership of the Society grew sufficiently to warrant further activity, so that at the second annual meeting which was also held at the New Grand Hotel, New York, plans were made for a campaign of education, and a new set of officers were elected for the ensuing year with instructions from the Council to increase the membership in every way consistent with the high aims of the Society, with the result that the third annual meeting brought together upwards of 280 of the first engineers in America.

This last year, under President Henry Hess, has seen the crystallization of many of the important phases, the entire elimination of the idea that engineers should be in any way tied to companies when they go to meetings, and while it is true that the Society has not doubled its membership within the last year, it is equally true that it has advanced the position of automobile engineers so that they are no longer under the shadow of the salesman, whose advantage lies in the fact that he has his foot placed directly and firmly on the money bag.

For 1910, the new officers included H. E. Coffin as president, and that this was a wise choice is being proven at every step. In the past, the work of the secretary has been done by voluntary service for the most part, although it is true that some payment was afforded to the secretaries of the last two years, but it was found that the best interests of the Society would be realized were the affairs of the same placed in the hands of some capable man at whatever cost. What Mr. Coffin proposes to do to satisfy this important situation is to put enough of stability into the situation to make it possible to engage and pay for the most capable managerial secretary possible.

With this idea uppermost, President Coffin approached Coker F. Clarkson, who will be remembered as the Assistant General Manager of the A. L. A. M., and it is now announced by the A. L. A. M. that Mr. Clarkson has severed his connections therefrom, with the understanding that he is to assume new and important duties in connection with the Society of Automobile Engineers. Mr. Coffin, at a recent meeting of the Council of the Society, expressed himself in relation to the future activities in fitting language as follows:

"The fast-growing motor car industry now stands, I believe, fifth in the schedule of the world's greatest industries, and no single branch of it out-ranks in importance the engineering.

"Among the main functions of the present and of the future of the S. A. E. are the publication of a digest of current technical literature; a bureau of technical information; collection of data for a standard handbook of motor car design; exhaustive motor and metallurgical tests; an intelligent direction of the work of standardization of automobile materials, parts and accessories; a comprehensive card index of automobile engineering; the presentation and discussion of technical papers of the highest class.

"We must place in active direction of this work a man of a rare combination of training and ability. He must have had experience in this line of endeavor and an adequate knowledge of automobile engineering conditions; he must be an organizer capable of originality, and above all he must be a tireless worker. We believe that we have the right man in Coker F. Clarkson."

The S. A. E., having 350 members, is absolutely representative of its field, and is without a rival or competitor, having maintained its identity and individuality, as it will continue to do. Most of the men experienced in automobile engineering are active workers in the society, and have a deep-rooted professional interest in it. Fifty new members have voluntarily joined the society since it became known that Mr. Clarkson was to direct it.

Collapse Foretold for Artificial Rubber Market

Price Level Outrageously High Trembles on the Pinnacle

A. L. A. M. Calls Meeting While Tire Makers Shun Buying in the Corner

HANGING by a single thread, the whole rotten fabric of the present manipulated and cornered rubber market is dangling and ready to fall, like an over-ripe and fly-blown peach.

Cable advices from London tell of another slump in crude rubber and another drop in the inflated issues of various companies that are alleged to produce it, but the most significant thing about the market abroad is the fact that American manufacturers will have nothing to do with it. In fact, the buying orders at present levels for crude are so small that something akin to dismay has already begun to find entrance into the minds of the speculative public of England.

The situation is critical and a decision on the part of the automobile tire makers of America not to submit to the exorbitant prices asked now, would undoubtedly lead to a crash that would make the South Sea Bubble's explosion seem like profit taking on a small line of long stock.

A. L. A. M. Calls a Special Meeting.

Such a decision is not unlikely to be announced at any time and indications point to some such action immediately following the meeting of the A. L. A. M. next Wednesday. The association has been called together to consider ways and means of providing tires for next year's turnout and the situation has developed a number of unusual angles.

The price of rubber is so high now, due entirely to the artificial conditions that prevail abroad, that tires made of crude rubber purchased at present price levels would be a prohibitive luxury. Consequently the tire makers are loth to buy.

The tire makers and the Association are really not at odds over the situation, and the proceedings of the meeting will probably uncover a common ground of defense for both sides.

The effect of an agreement not to purchase at this time would have a very definite result in the market. England has been crazy over speculation in rubber shares and crude rubber for months and many big fortunes have been made. As far as the purchase of shares in companies that are actually producing rubber is concerned, the movement had more than a tinge of legitimacy, but as the prices soared, the general public, including charwomen and hackdrivers and ill-paid clerks went into it with all the resources they could command. Much of the speculation was conducted on margin and on the installment plan, and yet the shares continued to climb.

But now, the first "bear" news has arrived and the market for both shares and crude rubber is hanging and drooping at the summit of the pinnacle. One little touch; one little breath, and the gold-mad gamblers will be engulfed in the most sudden crash ever witnessed in stocks.

If such a result only affected the rubber gamblers it could be viewed with equanimity by the public at large, but when the pyramided long accounts begin to crumble, the first effort will be to bolster them up with real collateral, including the British holdings of American dividend-paying securities. It may be predicted with certainty that in the event of a crash, wild-cat rubber shares will not be valuable enough to paper a spare-room in a New England farmhouse. Rubber itself has an intrinsic value and will always be in good demand, but its price will have to come down to something like an equitable basis before the demand for it will revive after the smash in shares.

A special meeting of the board of managers of the A. L. A. M. has been called for Wednesday, May 11, and according to the official announcement, one of the important things to be considered at the meeting will be the tire situation.

"This is extremely critical," says the letter sent out by the association, "and one that demands consideration at this time by the entire membership, as it affects every manufacturer as well as the present and future owners of motor cars.

"In this connection, it is requested that each board member before attending the meeting, will endeavor to investigate the rumors which are current to the effect that there exists among certain tire manufacturers of this country an understanding or 'gentlemen's agreement,' to increase the price of tires and to refuse to sell or deliver to manufacturers at this time any tires for 1911 equipment.

"It is hoped that you will obtain all the information available relative to the tire situation, so as to be prepared for an open discussion at the meeting, which promises to be one of the most important, from a makers' viewpoint, that the association has held.

"A number of other important subjects will come up for consideration at the meeting."

Tire Makers Advance Ideas; Will Not Be Quoted

The tire men shed some light on the subject and one of the prominent members of that branch of the trade said: "The present condition of the crude market, is, we believe, manipulated and far above legitimate levels. We sympathize with the automobile makers and appreciate their wish to contract for tires for their 1911 output, but our whole effort at this time is to avoid purchases of crude rubber while the market is in a cornered condition.

"If we contracted to sell tires right now, we would have to double the price asked last year, because of the remarkable rise in the crude material. If we contracted to sell at the prices of last year, we would all go broke if we had to buy our crude under current conditions.

"Consequently, we want to simply stand by for a while and wait for the bubble to burst.

"Reckoned on the price of crude rubber to-day, the price of tires would be practically prohibitive. We realize that fact and are quite as much interested in correcting conditions as the A. L. A. M. can be."

Tire Maker Tells of Conditions

F. A. Seiberling, president of the Goodyear Tire and Rubber Company of Akron, O., has given out a statement in which he says: "High prices prevailing for crude rubber are fairly attributable to two primary causes: First, the abnormal draft upon the world's supply; and, second, the wild speculation in rubber and rubber shares in England."

In the meantime, the consolidation of the Massachusetts Chemical Company, the Walpole Varnish Works, the Walpole Shoe Supply Works, all of Walpole, Mass.; the Valveless Innertube Company of New York City, and the Walpole Rubber Company of Granby, Quebec, has been announced. The consolidated concern will be known as the Walpole Rubber Company. The factories are at Walpole, Mass., Boston and Quebec with branches at New York, Chicago and London. A new factory building has been started at Walpole which, it is announced, will have a floor space of 100,000 square feet. The company makes, among other things, a seamless automobile tire.

Detroit Automobile Makers Pushing Deliveries

DETROIT, May 2—Activity in automobile manufacturing has caused a scarcity of skilled labor in this city, which the board of commerce has attempted to alleviate by advertising for help in numerous promising fields. The fields in which the advertising appeared did not relish it much and several protests were received by the Detroit authorities.

Outside of actual manufacturing, which is being carried on under pressure, building and expansion are apparent in every direction. The E-M-F Company has completed its big factory addition and the acquisition of the Glazier stove plant at Chelsea has been announced. This will probably be converted into an accessory factory.

The Grabowsky Power Wagon Company has purchased nine acres in Mount Elliott avenue and the Belt Line tracks and has broken ground for its main factory buildings.

The Stuart Commercial Car Company has leased the factory of the Co-operative Foundry Company and will proceed with the manufacture of commercial vehicles.

The manufacturing industry will be represented next year in Wayne, Mich., which is considered a Detroit suburb. The Swift Auto Company has broken ground for a factory, 60 by 250 feet in size, of brick and on a cement foundation. Detroiters have been promoting the plan and a sample car is already in operation.

The Ford Motor Company will be permitted to erect its proposed garage and showroom at Woodward avenue and the boulevard, Judge Donovan refusing Wednesday to issue an injunction asked for by Mary D. Randall.

One of the largest automobile garages in the United States will be erected in Detroit this Summer, on property recently purchased on Grand boulevard and Woodward avenue, according to the announcement of Thomas D. Buick, president of the Buick Auto Supply & Garage Company, of Saginaw, which was incorporated several months ago. The property purchased comprises 36,750 square feet, nearly all of which will be covered by a fireproof two-story structure, 100 by 245 feet in size.

The Regal Motor Car Company, of Detroit, is building another addition to its plant. This new structure is a combined brick, steel and concrete construction of the latest type, covering an area 249 by 598 feet.

The Taxicab Co. of America has purchased the building formerly used by the Henkel livery, and is equipping it as an up-to-date garage. The Henkel barn was recently the scene of a dispersal sale of horses and cabs, the business being given up as no longer profitable, since the advent of the taxis.

Alexander Byron Mohler, representing Mohler & DeGress of Mexico City, the largest dealer in motor cars in old Mexico, has been spending several days in Detroit, the guest of officers of the Hudson company. He says there are 2,300 cars in the City of Mexico, but warns manufacturers that nothing but sturdy cars will appeal to the purchasing class there, due to the altitude, the road conditions, and the amount of hill-climbing necessary to any prolonged trip.

The Sibley Motor Car Company has purchased a factory at Solvay and Mackie avenues, on the West side, and will start immediately installing machinery for the production of 2,500 twenty-horsepower pleasure cars. The facilities are considerable at the new location, the plant itself being 60 by 280 feet in size and the deal by which it was secured bringing with it two acres of ground, providing room for a large amount of expansion. The property adjoins the Wabash and Pere Marquette tracks and affords ideal shipping privileges.

Among the recent incorporations were the following: Oliver Motor Car Company, $300,000; Detroit Carbureter Company, $25,000; Johnson-Kellam Motor Sales Company, $10,000; Rotary Valve Motor Company, $100,000, and Robison Motor Car Construction Company, $20,000.

Two Days from N. Y. to Atlantic City and Back

The Two Days Reliability Contest from New York to Atlantic City and return on May 10-11 has developed to the point of almost forty entries, giving it considerable importance as a touring competition. Among the entries that may now be regarded as settled are the following list of standard makes, of which one or more are entered, not counting a considerable number which are really to be counted upon:

ENTRIES TO DATE FOR THE ATLANTIC CITY RUN

Pierce-Racine, Cole, National, Auburn, two Franklins, two Zusts, Chalmers, two Fords, Croxton-Keeton, Regal, Mitchell, Matheson, Haynes, four Maxwells, three Cadillacs, Marion, Glide, Overland, Mora, Correja.

Entries to the Glidden Tour

Entries to date in the Glidden Tour of 1910 include fifteen automobiles. For the Glidden trophy, two Premiers, four Chalmers, one Cole, two Maxwells and a Parry. For the Chicago trophy there are three Moline Auto Company cars, one Lexington, one Cole and one Parry. In the non-contestant class, two rapid-fire guns, mounted on Cadillac chassis, have been entered by the Northwestern Military Academy.

Date of Cobe Cup Race Is Changed

The latest information in relation to the Cobe event is that the date has been changed to July 4; it was originally given as July 2. The Speedway at Indianapolis will be the scene of the event and a big time is promised.

Fuller Buggy Company Prices

Two of the models by the Fuller Buggy Company of Jackson, Mich., were illustrated in the April 21 issue of this journal. The price of one of these models, which is fitted with solid rubber tires, was given as $1,500, and that of the other as $2,000. These prices should have been $850 and $1,165, as stated in the company's new descriptive catalog, which also illustrates and describes six other models, including one delivery models, including one delivery wagon. In this total of eight distinctive cars, two are equipped with a four-cylinder motor of 25 to 30 horsepower, while the other six, including model K, touring car, and model F, runabout, and the four models shod with solid tires, have a 22 horsepower engine of the two-cylinder, horizontally opposed type, placed crosswise under the hood.

Makers Forming an Association

Some progress has been made in the formation of the new automobile manufacturers' association in Detroit. The concerns so far identified with the project are the following: Anhut Motor Car Company, Carhartt Auto Company, Demotcar Company, Flint Wagon Works, Imperial Automobile Company, Paige-Detroit Motor Car Company, W. A. Paterson Company and the Warren Motor Car Company.

Woman Starts Across Continent

Miss Blanche Stuart Scott, accompanied only by her maid, left New York May 1, in an Overland 38, en route to San Francisco. No time limit has been set for the trip. If she is successful, Miss Scott will receive $1,000.

Philadelphia Activities on the Increase

PHILADELPHIA, May 2—Some idea of the activity of the various borough and township officials hereabouts in keeping tabs on automobilists may be gathered from the warning issued last Saturday by the Automobile Club of Delaware County giving details of the location of no less than 48 speed traps on the roads radiating from the city into the surrounding country, and within less than a score of miles of the City Hall. The warning notice also specifies a score or more of places where the officials are strictly enforcing the "Blow Horn" law; those localities where the powers that be are inclined to be lenient are also mentioned. The club is following up its good work along these lines by posting flagmen (at its own expense) on the more-traveled roads.

Much chagrined by the eleventh-hour decision of the Contest Committee of the Quaker City Motor Club not to include a commercial car class in last Saturday's roadability run to Atlantic City, Manager Daniels, of the Philadelphia Buick branch, will endeavor to bring about a contest on similar lines open only to various classes of self-propelled business wagons.

The Taylor Motor Distributing Company, agents in six States for the Warren-Detroit "30" and Matheson cars, and with Philadelphia as its distributing center, is now fitting up the entire ground floor of the big concrete building at Nos. 210-212 North Thirteenth street as its main headquarters, and will give up its temporary offices in the Real Estate Trust Building at the close of the present week.

South Bend Is Active Automobile Center

SOUTH BEND, IND., May 2.—Marvin Coppes, agent for the Chalmers-Detroit and the Hudson, and M. G. Smith, who has been chauffeur for Col. George H. Studebaker and in the testing department of the Studebaker Automobile Company, have formed a partnership and will open a garage at 333-335 South Main street, South Bend, the location being that occupied until recently by the White garage. The men will handle the machines for which Mr. Coppes is agent. Mr. Smith will look after the repair and mechanical department, and Mr. Coppes will have charge of the sales department. Mr. Coppes whose home is in Nappanee, Ind., will move to South Bend.

Glidden Pathfinder on the Homestretch

EMPORIA, KAN., May 4—The Pathfinder arrived here this afternoon after a 120-mile spin over roads unexcelled anywhere on the 1,900-mile route thus far. The Chalmers was piloted from Caldwell to Wichita and Emporia by Sam Hess of Wichita. An escort from the Kansas City Automobile Club met the trailblazers here and will lead the way to Missouri.

WICHITA, KAN., May 3—The final 1,000 miles of what is to be the longest of any Glidden tour was entered to-day by the pathfinding car, which ran from Enid, Okla., to Wichita, a distance of 115.8 miles, over roads which are on a par with the first section of the 216 miles run from Oklahoma City to Wichita.

There was something resembling a cloudburst in this district Sunday night, but it did no damage to the hard dirt highway.

Caldwell, an old-time cow town from which the glamour has been rubbed by agriculture and prohibition, was the first place passed after the pathfinder left Oklahoma this afternoon.

Change in Official Makeup of A. A. A.

Frederick H. Elliott has resigned from the secretaryship of the A. A. A. Robert Bruce has succeeded to the place thus made vacant.

Pathfinding Car Arriving at Huckin's Hotel, Texarkana, Tex.

Scene in Busy Dallas, Tex., Upon Arrival of Glidden Pathfinder

Paulhan Breaks Record; Wins $50,000

Louis Paulhan, aviator, broke the cross-country flying record for heavier-than-air machines when he flew his big Farman biplane from London to Manchester, 186 miles, making two stops en route.

Paulhan won a purse of $50,000 which had been offered by Lord Northcliffe on behalf of the London *News*. The French aviator came near having company on the flight, for White, the British enthusiast, starting nearly twelve hours after the Frenchman, made a gallant effort to accomplish the same trip.

Paulhan was greeted with a tremendous ovation when he gracefully guided his machine to the ground at Manchester. He complained of the bitter cold of the upper air.

The third annual Hill Climb of the Yale University Automobile Club will be held on Shingle Hill, June 7. The contest will be given under the auspices of the A. A. A. and the referee will be C. H. Gillette, president of the Hartford Automobile Club. There will be nine classes.

The first annual Hill Climb, to be promoted by the automobile dealers in Paris, Ill., will be held at that city May 11. Silver loving cups will be awarded the winer of each event, a fifteen-inch cup being hung up for the Edgar County championship.

Atlanta Event Has a Representative Field

THE three-day race meet, which opens on the speedway here to-morrow, does not give promise of being so big an event as the opening meet last Fall, when practically existing speedway records established at the Indianapolis speedway were shattered. Since that time, however, the mile board track at Los Angeles has sprung into existence and holds many of the free-for-all records established last Fall at Atlanta, so that the big thing with many who are here waiting for the three-day programme to open is, what board-track records are going to be beaten at this meet. So far as entries go the meet which will open to-morrow promises a disappointment in that the field will not be as big as it deserves to be. The programme for the three days shows 20 events in all, seven of which will be run on Thursday, and in these there is a total of 23 cars entered, or little more than three cars to the race. One reason for this small entry list is the refusal of the management to give appearance money. Many drivers said they would bring their cars down if they were given from $1,000 to $1,500 appearance money, and in addition, have their hotel expenses paid, as well as the expense on their cars to and from Atlanta. This, the management refused to do, on the just grounds that it wants to encourage stock car contests. In spite of this handicap, the field is a representative one and includes such cars as Marmon, National, Fiat, Stearns, American, Cole, Pope-Hartford, Knox, Allen-Kingston, Buick, E-M-F, S. P. O., and Firestone-Columbus. Although one or two makes represented last Fall have not arrived, the number of each make present is sufficient.

The programme includes two excellent events, both 200-mile races for special speedway trophies. Both are new trophies, and were not contested for at the meet last Fall. It was the intention to have the two big trophies put up last Fall, contested for this Spring, but both the Buick and Rainer people claimed they had a right to hold their trophies for one year and refused to allow them to be raced for at this meet. As a result two new ones have been made, each costing approximately $3,000, and of better value than those of last Fall. Each will have to be won three times in succession. One is known as the Atlanta Speedway Trophy, and will be raced for Thursday, and the other, Atlanta Automobile Association Trophy, will be raced for on Saturday. The Thursday race will bring out two Nationals, one Knox, one Marmon, and one S. P. O. This is for cars rating at 301 to 450-cubic-inch piston displacement. The Saturday race is for 451 to 600 Class and has a good entry list. Of the 21 events listed for the three days, ten will be strict stock-chassis events, and the stock requirements of the cars will be gone into with the greatest care. It might be remembered here that at the Los Angeles board-track meet not a single stock-chassis event took place, so that not one of the stock-chassis speedway records have been effected.

Capt. William Mitchell Lewis and Family Sailing for Europe

C. M. C. Completes Important Sign Work

CHICAGO, Apr. 25—Saturday marked the completion of the first step of the Chicago Motor Club's signboard campaign, when the last of the four routes selected for by the local organization, the one to South Bend and return, was finished. This work has been delayed by the severe winter. A two-ton Rapid truck, donated by Siegmund-Baylies Company, of Chicago, agent for the car, helped the motorists in carrying on this work.

The truck has been on the road for a week now and the latter part of the week it encountered the snowstorm, but despite this handicap it daily carried a heavy load of signs and posts and finished the task on schedule time.

The Chicago Motor Club now has spent more than $2,000 in erecting signs on the roads leading into Chicago. It has put seventy-eight signs on the Lake Geneva route, sixty-nine on the South Bend, 110 to Beloit and eighty-three on the Milwaukee stretch. Now there are signs on 369 miles of roads in this vicinity, and the club has marked the four main arteries of motor traffic running into the city.

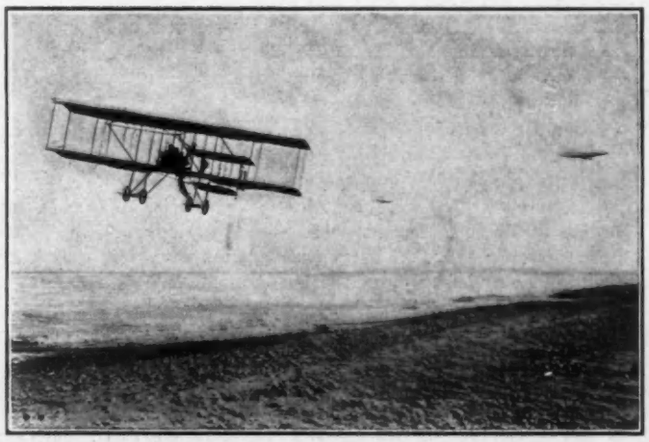
The new plant of the Victor Lamp Company at Cincinnati is ready for occupancy. The company is turning out equipments for 300 automobiles a day and when the whole factory is in full operation, there will be about double that number produced.

Effimoff Wins Everything at Nice Meeting

This picture shows a remarkable scene. Three areoplanes are in full flight along the edge of the sea at Nice. The one in the foreground is Effimoff, in his Farman biplane, speeding along the beach. The one to the right is Latham in his Antoinette monoplane, and the distant gull-like figure is Olieslagers in his Bleriot monoplane.

Capt. Lewis Sails Abroad for Rest

Captain William Mitchell Lewis, president of the Mitchell Lewis Motor Car Company, with his family boarded the Cunarder Mauretania just as she was preparing to sail for Europe, where Captain Lewis and his party will enjoy an automobile tour and other recreation under most auspicious circumstances.



Remarkable Aeronautical Picture Taken at Nice Aero Meeting

Hub Doings Attract Much Attention

BOSTON, May 2—The legislative committee that heard the motorists on proposed changes in the present law, made their report last Friday when a draft of a bill was sent to the House and Senate. When the motorists realize what the bill provides they will not be pleased. There are some commendable changes such as not compelling chauffeurs to wear badges; a clause under which many of them were fined, frequently, and allowing number plates to be 48 inches from the ground instead of 36. But the two clauses in which most motorists were interested, the revoking of the section compelling the blowing of horns at every intersecting street, and the reciprocity clause allowing non-residents the same privileges that their States give us, are not what was expected. The latter is particularly bad, for under the guise of a reciprocity clause the committee has reported a change that simply draws the lines tighter and says no non-residents shall operate for more than 10 days in any one calendar year. Then follows the psuedo reciprocity clause, providing that other States from which non-residents come grant the same privileges to our motorists, with the highway commission as final arbiter. So it matters not that Maine allows Bay State men to roam all over its State without restrictions; that New Hampshire allows them to go in and out as often as they want unless they stay 10 consecutive days; and that Vermont allows them to travel around from 10 to 60 days, the Massachusetts legislature under this law proposes to say to them: "Thou shalt not cross our border more than 10 times without paying tribute, no matter how liberal your States are to our motorists." It is a most unfair advantage and will lead to a lot of trouble, for motorists in those states, who traded in Bay State cities, will refuse to do so and look around to make purchases at home. The first draft of the noise-making clause attempted to bar the blowing of some of the well-known makes of horns in the different cities and towns, but this has been modified. There is also a clause forbidding motorists to allow too much smoke to escape.

If the plans outlined by Chester I. Campbell, manager of the Boston motor shows, materializes there will be a real outing for children this year in the Hub on June 8 which will attract much attention. In other years the dealers were the only ones who could be induced to loan cars and the limit generally was about 25, so that about 125 youngsters were all that enjoyed an outing. These comprised blind children. Mr. Campbell now thinks that he may be able to reach a sufficient number of owners to insure a better showing. Last Saturday he sent out 2,000 letters to Boston motorists asking them to help this worthy cause and if the number of cars are sufficient more than 800 children will be taken care of on a trip to Sharon. In addition to the blind children it is planned to give the crippled children an outing.

Delaware Valley Run Decided

Around a figure eight course, the crossroads of which were at Trenton, N. J., the Delaware Valley Endurance Run was successfully held Tuesday. The entries, numbering 24, were divided into three classes as follows: Class A, cars valued at $2,001 and over; Class B, from $1,001 to $2,000, and Class C, $1,000 and under. Class A and B ran 300 miles, three times around the course, and Class C traveled 200 miles. Four cars in Class A finished with perfect scores: Speedwell, Locomobile, Sharp Arrow and Crawford. In Class B, two Mercers were not penalized and in the other class a Maxwell had a perfect score. Twenty-one out of the 24 starters finished the run.

Quaker City Third Annual Roadability Run

(*Continued from page* 831)

After checking in, the cars were trundled around to Young's Million Dollar Pier and were parked in the big ballroom. At least many of them took advantage of this arrangement, although a few turned around immediately after the finish and started back for Philadelphia.

The scene on the pier was one full of life and color. The cars, including many of the well-known makes and styles, were stationed in lines and series and presented a brilliant picture to the eye of the observer. A big crowd assembled at the Strand, the streets were filled with sightseers, the boardwalk was comfortably filled and the automobile was the center of attention.

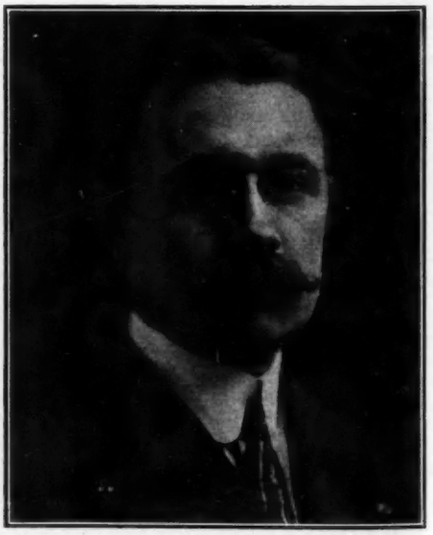
Up to the moment of the official announcement, those who had been successful in winning one of the coveted cups were in complete ignorance of their success.

After the clerical work had been cleaned up, hands adjourned to Young's Pier where Mayor Stoy made the announcements and felicitated the winners and those who did not win.

The cups awarded were as follows: First prize, Mayor Franklin P. Stoy's cup; second prize, the Hotel Strand cup; third prize, President L. D. Berger's cup; fourth prize, the Hotel Walton cup, and fifth prize, the board of governor's cup.

The officials who had charge of the run were as follows: Honorary referees, Mayors Reyburn and Stoy; assistant honorary referee, Alfred E. Burk; referee, R. E. Ross; official starter, G. Hilton Gantert; associate member contest board A. A. A., P. D. Folwell; official timer, Paul B. Huyette; pacemaker, J. Fred Betz, 3d; press, George M. Graham and Secretary Harry C. Harbach.

The reception committee at Atlantic City consisted of the following: Harry B. Cook, C. Stanley Grove, Walter E. Edge, Warren Somers, Louis Kuehnle, David R. Barrett, Philip B. Grove, Col. Lewis T. Brown, M. B. Woodruff, S. S. Phoebus, Jacob Weikel, Harry Wootton, C. D. White, Col. Thos. Potter, Jr., Frank B. Off, A. J. Royer, William J. Black, Edward S. Lee, Henry Bolte, Jr., Charles R. Myers, Isaac Bachrach, George W. Carmany, Howard Bennett, Gustave Kessler and Martin E. Keffer.



Paul B. Hayette, president Timers' Club

The Regal "Plugger," decorated with credentials from various cities in which it has visited recently was the object of considerable interest at the start and finish and along the way. During Saturday night and Sunday an impromptu automobile show was held on the steel pier under the auspices of the Automobile Trade Association.

Long Island Automobile Club

(*Continued from page* 853.)

uniquely furnished. In the front of the big room is the assembly hall, with its dais for the presiding officer. Ranged in front of the platform are half a dozen varieties of comfortable seating devices, including swings, lounges and big, comfortable chairs. Periodicals are kept at hand and a bulletin board gives opportunity to the club for publication of announcements. A case of trophies and a series of speaking pictures completes the room. Back of the assembly hall is the grill-room, adequately equipped to take care of the wants of the inner member, and to the right is the kitchen, presided over by a chef of demonstrated merit. To the left of the kitchen and behind the grill-room is the ladies' room, smartly furnished and of comfortable size and equipment.

The two upper floors are used for car storage and maintenance work, and the ground floor contains the main garage of the club. The basement, as has been noted, is devoted to the washing and heavy work on the cars. All told, the garage equipment of the club is sufficient to accommodate seventy-five cars, and the space is all occupied. The charges are moderate and the club has every facility for furnishing oil and gasoline, and in a limited sense, supplies of other kinds.

A pit for inspection, and a big elevator for communicating between the various floors of the garage, complete the facilities of the club.

Membership in the Long Island Automobile Club includes membership in the New York State Automobile Association and the A. A. A., with all the influence and advantage that may accrue from those connections. The utility of the club is shown emphatically in one direction. Arrest is not impossible to the most careful driver of an automobile. It may come at a time when the motorist does not happen to have the formal but necessary $100 in his pocket to be used as bail. In that case, the member of the club has only to telephone to the club house, and a surety bail bond will be filled out and rushed over to him.

The club held the first 100-mile endurance test ever held in America and the first one-mile straightway speed contest over the Coney Island boulevard, and has handled numerous other important and epoch-making events.

The officers of the club are as follows: Allen C. Aldermen, president; Louis T. Weiss, vice-president; Charles C. Cluff, treasurer, and C. Stewart Cavanagh, secretary.

The Board of Governors: Herbert G. Andrews, Dr. H. R. Price, Dr. William P. Richardson, Frank G. Webb, William Schimpf, and Dr. C. B. Parker. The manager is Charles S. Ellis.

The heads of the various standing committees are: C. Stewart Cavanagh, House; Frank G. Webb, Entertainment; William Schimpf, Garage; Louis T. Weiss, Contest and Tours; Charles Jerome Edwards, Good Roads; Jay S. Jones, Press; Allen C. Alderman, Membership; Louis T. Weiss, Technical; Herbert G. Andrews, Law and Legislation, and Dr. H. R. Price, Finance and Auditing.

Best Means for Dustproofing the Highway

(*Continued from page* 845.)

panying schedule are perhaps particularly unreliable, because the machinery and the economical work methods which should by all means be used have been applied only under European labor conditions. To have this improved machinery, or something equivalent or better, applied in America under test conditions, with all it involves of saving in dustproofing materials and labor time, seems to be one of the most important requirements of the moment, in the cause of dustless roads.

On no point do the records vary so widely and fail so uniformly in completeness as on maintenance cost, and the failure seems to be due partly to lack of time, but mostly to lack of data on the traffic and possibly lack of appreciation of the almost directly proportionate relations which exist between the density of the traffic and the cost of the maintenance. As types of road are selected with reference to the heaviest and fastest traffic they have to sustain, and the proportion between heavy and light, slow and fast vehicles is nearly constant on any road, statistics merely giving the average number of vehicles passing over a road per day, month or year would be of the greatest assistance for bringing the available data on maintenance cost down to a common basis for comparison. The little which has been done in this respect tends to show that on all kinds of road the wear and maintenance cost are nearly pro rata with the numerical volume of the traffic, after this reaches 500 vehicles per day. If it is assumed that no road carrying less than this volume of traffic will usually be considered in a dustproofing project, the maintenance cost at this volume of traffic should afford a convenient unit for an estimate, and it has been so used in the accompanying sketch for a schedule. For this reason the items of maintenance cost will appear low, in comparison with experience based on denser traffic, and the cost of dustproofing may be given relatively high, as the figures for the latter are naturally based on data from stretches of roads where the traffic is heavy, while its volume could not be taken into proper account, because it was not given. Whether the cost of dustproofing processes increases pro rata with the traffic or at a much slower rate, is a question which it seems impossible to even guess at, for the present, but those competent to prepare a complete and technically correct schedule will doubtless be able to fix a ratio which will be sufficiently accurate.

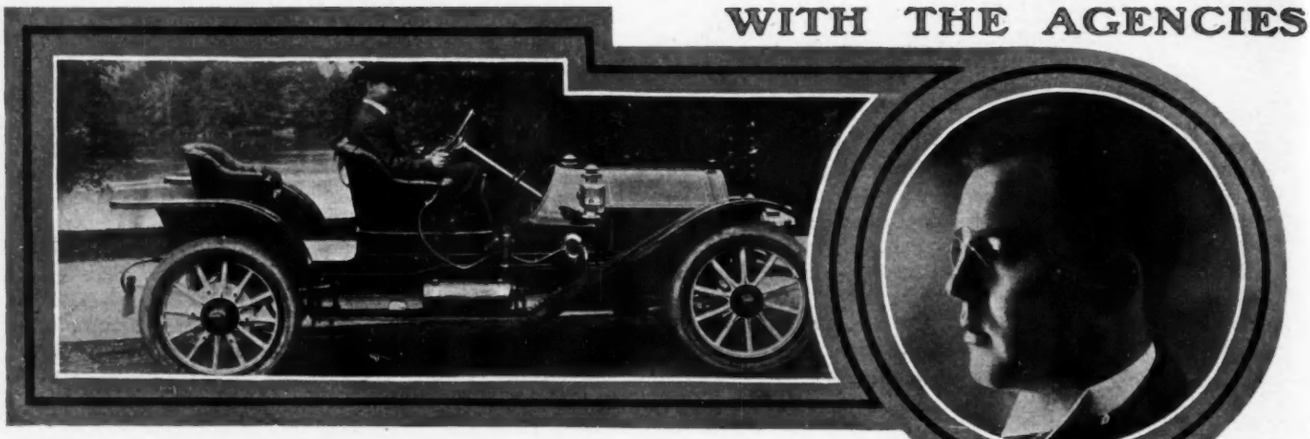
In applying even a corrected schedule, however, to a road project and trying to decide in advance what the maintenance cost will be for the completed dustless road, it will probably be safe to assume that any country thoroughfare, so situated that it requires to be made dustless, will attract one hundred per cent. of additional traffic from neighboring roads, as soon as the improvement is made; and at this point one discovers an advantage in the dustless thoroughfare which has been little noticed.

All the domestic data of maintenance fail to take account of one element in cost reduction which has been well demonstrated in Europe. Any system of regular and continuous maintenance, such as is made possible when financial provisions are made in advance for a period of twenty years or longer, results in a compacting and adaptation of the roadbed to its traffic, which gradually reduces the average cost of the maintenance below any estimate based on data from the first five or ten years of the road's existence.

Worcester Dealers Organize

WORCESTER, May 2—The Worcester Licensed Automobile Dealers Association has been organized with six firms as charter members. The members are: Lemont Motor Car Company, John S. Harrington, Worcester Motor Car Company, Macker-Tyler Company, Harry J. Murch, and Norcross Auto Company. Officers: President, B. A. Lemont; vice-president, Fred B. Williams; secretary-treasurer, Oliver P. Tyler; clerk, Jay Clark, Jr.

WITH THE AGENCIES



Joseph Tracy, of New York City, the well-known automobile engineer, at the wheel of his Chalmers Thirty runabout, in Central Park

Peter S. Steenstrup, of Hyatt Roller Bearing Co. and Nat. Association of Manufacturers

E. M. Long & Sons have assumed the Overland agency at Cadiz, Ohio, for Harrison county.

H. J. Smith, Cleveland, has been appointed Regal agent for Ravenna and surrounding territory.

E. L. Leinbach & Co. have moved the local Matheson car agency to 21 East North avenue, in the rear.

Will J. Friel has taken the agency for the Overland at Marietta, Ohio. He will cover several counties in Southeastern Ohio.

The C. N. Lippart Auto Company, of Lorain, Ohio, was incorporated with a capital of $5,000 to do an automobile business.

Another new agency in Pittsburg is that for the Pullman car, which will be at 6113 Centre avenue with J. E. Graham in charge.

Reis & Co. have assumed the agency for the Warren-Detroit Car in Baltimore. The salesrooms and garage are at 21 East North avenue.

The Only Car will be handled in Cleveland by J. H. Anderson. The car sells for $700 and, its makers claim, has a rating of 60 miles an hour.

J. A. Boyd has organized the Commercial Auto Sales Company for the sale of Chase delivery wagons and Gramm trucks in the Cleveland territory.

Harry E. Pence, of the Pence Automobile Company, recently purchased a 220-foot tract of land, where a temporary structure is to be built immediately for warehouse purposes.

Dr. Leon C. Long has secured the exclusive agency in Western Pennsylvania for the Babcock electric car of Buffalo, and will be located in the Rittenhouse Block on North Highland avenue, Pittsburg.

Kimmell Bros., Fourth and Spring streets, Columbus, O., have taken the Central Ohio agency for the Badger, manufactured at Columbus, Wis. The company has been handling the Speedwell and the Overland.

H. J. Schwartz, formerly a veterinary surgeon but more lately connected with the Atlanta branch of the White Co., has been engaged by C. H. Johnson, local agent for the Stevens-Duryea car, to manage the sales in this territory.

The Georgia Motor Car Company, of Atlanta, G. W. Hanson, president and manager, has absorbed the J. J. & J. L. McLendon Co., which sold the National car. Hereafter the Georgia Motor Car Company will sell the National car, in addition to the Benz, the Randolph truck, E-M-F, Flanders and Studebaker.

Coates-Goshen Company moved this week from 1619 Broadway to 1864 Broadway as was also the branch of the Dayton Airless Tire Company, which is jointly occupying the new store room.

The American Garage, of Indianapolis, has been chosen agent for the Royal Tourist in that city. Sales Manager H. M. Adams, of the Royal Tourist Car Company, Cleveland, announces that other agents will be chosen within a week.

Baron Van der Noot de Vrecken de Moorsal will represent the Krit Motor Car Company, of Detroit, at the Brussels Exposition. The Baron believes that there is a great future for low-priced American cars in Europe. He sails May 10.

David Davis, Jr., of Racine, Wis., has been appointed mechanical superintendent of the new gasoline and oil engine department of the J. I. Case Threshing Machine Company at Racine. Mr. Davis studied in German for three years after graduating from the University of Wisconsin.

Harry S. Moore has secured the agency for Northern Ohio for the Overland car. Mr. Moore has for some time past been distributor of the Stoddard-Dayton, National and Courier. The Overland has for two years been sold in Cleveland by the Overland Motor Car Company.

Harry J. Murch, Worcester, Mass., who has been agent of the Cadillac and Peerless automobiles, has purchased the interest of his partner, Charles E. Hidden, and will continue the business alone. Mr. Murch is to move his business June 1 from Central street to the new garage now being built on Main street, near Hermon.

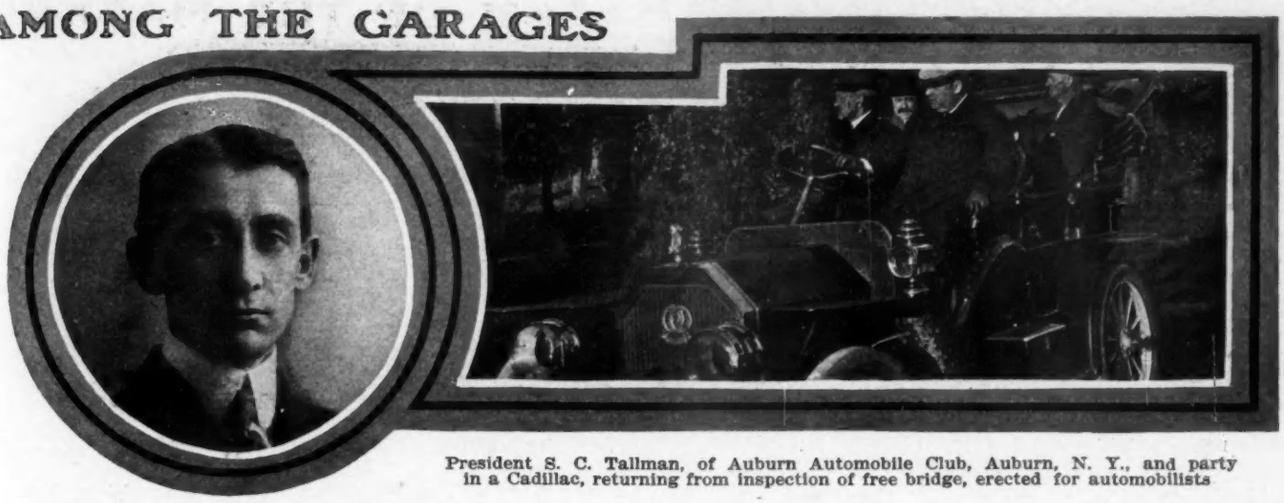
The Morrison Motor Car Company, of Chicago, an Illinois corporation with $15,000 capital, has filed articles and a statement to do business in Wisconsin. The local interests are $2,500. The Morrison company handles the Pierce-Racine and has established Wisconsin sales headquarters in Milwaukee.

Among Pittsburg firms which have recently moved or enlarged their quarters are the Pittsburg Automobile Company, which is now at 5909 Baum street, East End; the Pioneer Top Company, which has moved from Butler street to 5472 Penn avenue, and the Pittsburg Automobile Equipment Company, which has leased another big room on Baum street.

The New York Auto Supply Company, 1755 Broadway, New York City, have just secured the distributing agency for the Parry car, made by the Parry Automobile Company, Indianapolis, Ind. The territory comprises the Metropolitan district of New York below Albany, New Jersey and the lower half of Connecticut. The company will appoint agencies in all of the principal towns.

The Haynes Automobile Company, Minneapolis, has recently placed the Regal agency in Duluth and along the Iron Range with the Interstate Auto Company. P. J. McGuire, manager of the wholesale department for the Haynes company, made the arrangements.

AMONG THE GARAGES



President S. C. Tallman, of Auburn Automobile Club, Auburn, N. Y., and party in a Cadillac, returning from inspection of free bridge, erected for automobilists

R. M. Owen, now vice-president Reo Motor Car Co., Lansing, Mich.

James P. Roodhouse, of Medora, Ill., is erecting a new garage.

Elyria Garage Company, of Elyria, O., is organizing an auto livery service for that city.

George Bettes will manage the new garage now being erected by C. D. Fenn at Antigo, Wis.

The Buckeye Garage & Sales Company has doubled its force of workmen as well as its floor space.

The Moyle garage building at 135-137 South State street, Salt Lake City, Utah, is nearing completion.

Metzger & Wells have a contract to build a $10,000 garage for Clarence A. Warden, in Haverford, Pa.

The Louisiana Motor Company has completed its garage near Baronne and Julia streets, New Orleans, La.

D. M. Huntington, of Grand Rapids, Wis., will open a garage. He has been conducting a repair shop for a year.

John W. Yule has opened a large garage and repair shop at 448 Broadway, Paterson, N. J., where he will handle the Pullman automobiles.

John Conway, T. W. Orbison and Dr. D. J. O'Connor, of Appleton, Wis., are the incorporators of the Appleton Garage Company. This company is building a large public garage in Appleton.

The Ohio Auto Sales Company has completed the work of remodeling the new garage and sales room on North Park street, near Goodale street, Columbus, O. The company handles the Ford in Central Ohio.

Stoll Brothers of Mt. Pulaski, Ill., are erecting a three-story brick building, the first floor of which will be used as an automobile garage, the second floor as a display and sales room and the third floor as a public dance and lodge hall.

J. Z. Wilklow, of Mishawaka, Ind., has commenced the erection of a one-story automobile garage on his property adjoining the new Mishawaka Hotel. The building will be 50 by 150 feet and will have conveniences for cars and repairs.

Schmidt & Herres, proprietors of the New London Iron Works, New London, Wis., are building a garage adjoining their shops. It will accommodate ten cars. The firm has taken the agency for the Overland and will make a feature of repairs.

The English Motor Car Company, of Massillon, O., was incorporated with a capital stock of $25,000 to engage in the general automobile and garage business by F. A. English, W. P. English, H. W. Loeffler, George W. Krotsch and Homer A. Hoftzer.

Dr. O. H. Thorpe and George A. Rauch, of Marysville, O., have sold their garage and repair business on Plum street to the Marysville Motor Car Co., recently organized by A. Earl Harvey and Walter M. Otte. Mr. Harvey will be general manager.

The Connellsville Garage Company has bought 65 by 165 feet on Apple avenue, Connellsville, Pa., and will build a $15,000 garage at once. The building will hold 40 cars and the company will start a repair and accessory business as well as a taxicab line in June.

The Fourth Street Auto Garage and salesroom, Barberton, O., was opened April 1 with Dr. G. E. Gardner, president, and E. G. Grady, secretary and general manager. They are agents for the Halladay and De Tamble cars in the counties of Summit, Medina and Wayne.

P. H. Haber, district agent for the Ford at Fond du Lac, Wis., has leased the Hass Garage, Macy street, between Forest avenue and Division street, and has taken possession at once. The name will be the Ford Garage and a general livery, repair and garage business will be carried on.

The Hoaglin Auto Company, of Oshkosh, Wis., is rushing work on a large new garage building in order that it may occupy the building by June 15. It is of fireproof construction, with brick walls and steel-trussed roof and will be ample to care for the immense transient garage trade developed by the Hoaglin interests during the last three or four years.

F. J. Briquelet, of Green Bay, Wis., has opened a garage at 215 Stuart street and will handle the Kline Kar. He is negotiating for several other lines. Mr. Briquelet was formerly associated with the Green Bay Motor Car Company, and is an expert mechanic. The present quarters are temporary and Mr. Briquelet plans to get a larger building before July 1.

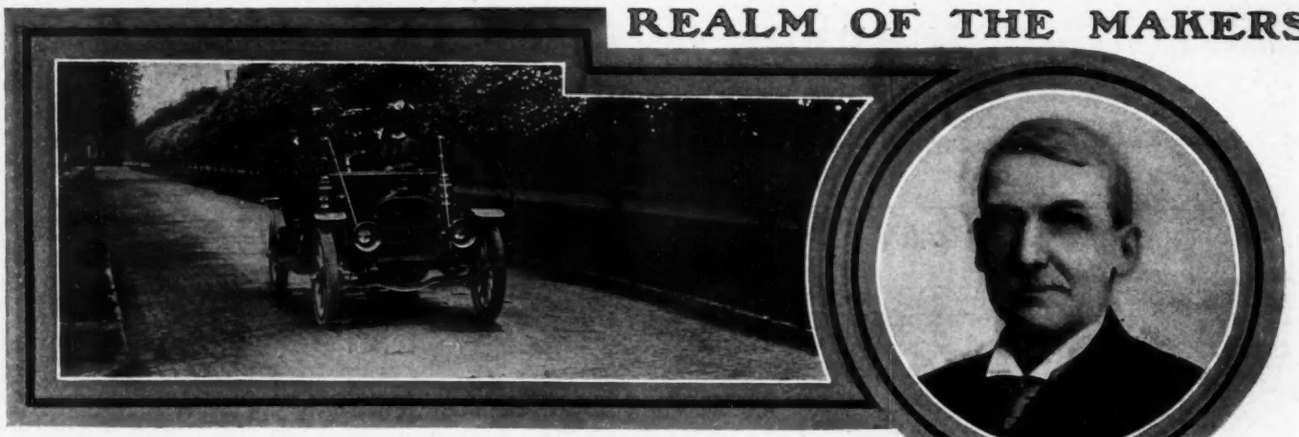
Personal Trade Mention

Herbert L. Shearer, for six years general manager of the plant of the Chicago Brass Works at Kenosha, Wis., has joined the central offices of the American Brass Company at Waterbury, Conn. George Allen, assistant manager at Kenosha, succeeds Mr. Shearer.

Peter S. Steenstrup, secretary and general manager of the Hyatt Roller Bearing Company, is enjoying a vacation. Mr. Steenstrup has been closely confined by business cares for several years and now he is going to spend several weeks resting. His rest will include mountain climbing and fishing in mountain streams of Oregon, the Columbia and the Pacific Ocean. Mrs. Steenstrup accompanies him.

J. B. Comstock, for six years with the Westinghouse Electric & Manufacturing Company at its East Pittsburg works, and for four years manager of its publication department and printing plant, severed his connections with that company in April to accept a similar position with the P. & F. Corbin Company, of New Britain, Conn. Prior to Mr. Comstock's connection with the Westinghouse Company, he filled the same position with the Corbin Company that he has recently been recalled to assume.

REALM OF THE MAKERS



View of one of Rochester's flower lined streets, the justly famous Oxford street, showing a Selden car among the magnolia trees

Geo. B. Selden, president of the Selden Motor Vehicle Company

The Ford Motor Company built and shipped out 1,035 cars between April 18 and 23, according to the records of that company.

The Fry Manufacturing Company, a concern organized to control the manufacture and sale of the Fry plug, is located at 1779 Broadway, New York City.

The Dayton Rubber Manufacturing Company has decided to increase its capital stock from $150,000 to $500,000 in order to provide for enlarged and augmented facilities for manufacture.

The Whitney Manufacturing Company plans for immediate construction of a five-story addition to the present big plant in Hartford, which is to be completed and ready for occupancy by October 1.

The Monitor Automobile Works have removed from Chicago to Janesville, Wis. The new plant has a floor space of 75,000 square feet, which is a material increase over what was formerly occupied.

The Billings & Spencer Company, of Hartford, has just completed a fully equipped emergency hospital in connection with the local plant, which is the outgrowth of a very modest beginning, a first aid cabinet.

The Rapid Motor Vehicle Company, of Pontiac, Mich., has purchased 16 acres of land adjacent to its present plant, and within two months, according to present plans, another big building will be completed and in running order.

The Castle Lamp Company of Amesbury, Mass., has purchased the assets of the Atwood-Castle Company and assumed its liabilities. The capitalization of the new concern is $300,000. F. E. Castle will have the management.

The Standard Specialty Company, of Cleveland, was incorporated with a capital of $10,000 to manufacture automobile accessories by Harry Dolitz, Cornelius Sheehan, Leo J. Kellosky, Charles M. Robertson and Louis M. Kleinhenz.

The Fal Motor Company of Chicago will be moved to Champaign, Ill. That city has agreed to give a site and erect the factory buildings to cover at least 100,000 square feet. The plant is expected to be in running order by Aug. 1.

The Pittsburg Motor Company, which manufactures the "Pittsburg Six" car at New Kensington, Pa., has bought from the Dawes Mfg. Co. of Braddock, Pa., a $25,000 site in Braddock, on which it will build a factory to employ 500 men.

The Warren Motor Car Company's new factory at Detroit will be completed by Jan. 1, 1911, if the plans of the construction, work out as expected. The first of the buildings 600 by 60 feet is approaching completion and the two others are progressing.

The Auto Motor Castings Company, of Cleveland, was incorporated with a capital of $50,000 to manufacture castings and other accessories for motor cars by Adelbert J. Miller, Charles H. Gunkleman, William Schofer, William Baisch and Elex L. Appleby.

With a factory 600 by 60 feet, three stories high, the Schacht Mfg. Co., of Cincinnati, is planning to enlarge its plant. The increased facilities will allow the company to treble its output in 1911. The capital stock of the company will be increased from $100,000 to $500,000.

The United Manufacturers will remove from their present quarters at Seventy-sixth street and Broadway to Motor Hall, 250 West Fifty-fourth street, where they will have offices covering 10,000 square feet of floor space. The change will be accomplished May 1.

The Auto Tire Re-enforcement Company of Auburn, Indiana, has reorganized and incorporated under the name of Double-Fabric Tire Company. A. L. Murray is president and W. H. Willenar is secretary and general manager. Tire re-enforcements and emergency tire repairs of various kinds will be manufactured in large quantities.

The Connecticut Shock Absorber Company, of Meriden, Conn., has purchased the tools, dies and stock of the Sager Shock Absorber Company. The former concern announces that the reason for the retirement of the Sager company is that its device was an infringement of the patents held by them.

Deliveries of the new 1910 type of six-cylinder, sixty-six horsepower cars of the Pierce Arrow Motor Car Company will begin in July. This will be in time for the latter part of the touring season and so that cars for fall touring in Europe may be available for those who intend to put them to such use.

Announcement is made by the E. R. Thomas Motor Company that the 1911 models of that company probably will be practically identical with those of the current year. While a definite decision has not yet been reached, the preliminary work indicates that any changes that may be made will be matters of detail rather than any radical departure in the construction.

The annual meeting and election of the Hartford Rubber Works Mutual Benefit Association resulted as follows: President, C. B. Whittlesey; vice-president, George Holloway; secretary, A. Elmer; treasurer, E. Fothergill. During the past three years there has been paid out in benefits to members $5,000 in cases of sickness and death. The association has a membership of 500.

A consolidation of the Standard Gauge Steel Company and the Standard Connecting Rod Company, of Beaver Falls, Pa., has been effected. The new corporation will be known as the Standard Gauge Steel Company. By the merger, facilities will be improved and capacity increased. The full lines made by each of the companies interested will be continued and others under consideration added. The management will be practically the same as it has been in both corporations.

NEWS IN GENERAL

Five ton load of orphans on a joy ride with Hal Sheridan at the wheel of White truck. A reminder of the Orphans' Day, which is soon to be celebrated

Alexander Winton, president Winton Motor Carriage Co., Cleveland

Paterson "30" cars will be sold in Brockton, Mass., by the Gay Automobile Company, 345 Warren avenue.

Hemery, Hanriot and Bruce-Brown will drive cars in the Grand Prize race on the Long Island Motor Parkway next fall.

Four Cleveland factories have announced their intention of entering the Glidden tour. Two private entries are also promised.

The Miller Rubber Company, of Akron, Ohio, has increased its capital stock from $250,000 to $500,000. The company has doubled its capacity during the past year.

The Chicago Vulcanizing Company, of Chicago, has certified to a change of name to the Chicago Tire and Supply Company, and increase of directors from three to five.

The Ford Motor Company has beaten all records for shipments to Pittsburgh. Sixteen carloads of Model "T" Fords, including 48 autos, came in over the P. & L. E. Railway last Saturday.

The Locomobile Company of America, capitalized at $5,000,000 in New York, has been incorporated in the State of Illinois, with offices at Chicago. The capitalization in Illinois is $131,600.

The Selden car that will take part in the Brighton Beach 24-hour race has arrived at the track. The car is being given a special preparation under the guidance of George E. Mack, who will pilot it in the race.

The Washington Post Touring Test run from Washington to Richmond, Va., will be held May 27 to 31. Eleven entries to the event have been received so far and many more cars have been promised for the contest.

The New Jersey Automobile and Motor Club is seeking a location for its country branch. Officers and members have been engaged in seeking ideal sites, and it is reported that there have been found several that answer the requirements.

U-auto Varnish Company, of Cleveland, was incorporated with an authorized capital of $50,000, to manufacture an automobile varnish, by C. O. Perrin, A. B. Newland, H. L. Hullinger, H. W. Perrin and A. L. Talcott.

In the issue of THE AUTOMOBILE of April 7 reference is made to the "Apple Automobile Lighting Dynamo." While the system is made by the Apple Electric Company, of Dayton, Ohio, the trade name under which it is marketed is "Aplco."

The Cleveland Transmission Gear Company was incorporated with a capital stock of $5,000 to manufacture gear wheels for transmission of power in automobiles by R. H. Williams, Marion Kirkely, E. C. Kirkely, C. A. Myers and F. H. Hartman.

Cleveland Taxicab Company, of Cleveland, Ohio, was incorporated recently with a capital stock of $100,000 to operate a number of taxicabs. The incorporators were Charles S. Wachner, F. B. Williams, R. A. Wilbur, J. B. Graham and Benj. A. Gage.

More automobiles were sold in the United States during the thirty-one days of the month of March than in any corresponding period in the history of the automobile industry, according to reports received from many factories now working overtime.

W. R. Hines announces that he will locate a factory in or near Cleveland to manufacture a four-cylinder, two-cycle car designed by him. Mr. Hines has been experimenting with the Hines car for six years. He proposes to make 500 cars for 1911 delivery.

Rene M. Petard, manager of the European branch of the Mitchell-Lewis Motor Company at Paris, writes that the American idea in motor cars is making satisfactory progress abroad. M. Petard says that the success of the Mitchell car has been considerable.

The Goodrich Company, of Akron, O., recently started a road marker out from its factory. For the present, the roads around Cleveland, Akron and Canton will be marked. The marker will then start east from Chicago to Buffalo, thence through Albany to New York.

L. C. Alexander resigned from the Cleveland Warner Instrument office staff Saturday, to accept a position with the Willard Storage Battery Company. He will have charge of the automobile lighting department of the Chicago office. The Willard company is designing a miniature lighting system, the same as is used on trains, for automobiles. It will be on the market in a short time.

Spokane, Wash., is to have an agency for the Lozier, according to the announcement of the Metropolitan Motor Car Company, of that city. The territory includes Seattle and Portland. W. T. Sleddon, who formerly represented the Lozier in Seattle, has associated himself with the Metropolitan Company.

Sharp-Arrow cars are better known in racing than in trade circles, as this car, which is made in Trenton, N. J., has put up some fine performances over the Motor Parkway and the Riverhead courses. William Sharp, the builder, has completed plans for a special racing car which he intends to drive himself in the Grand Prize race on the Parkway next October.

Additional contracts have been placed by the Pierce-Arrow Motor Car Company, of Buffalo, with the Aberthaw Construction Company, of Boston, for the doubling of the size of the present office building of the former's Buffalo plant, for adding 200 feet to the motor testing building and the garage, and for building the truck assembly shop. The Aberthaw Company has just completed the large storage building and has partly completed the nickel-plating building of the plant.

PROMINENT ACCESSORIES

New tire and accessory store of the well-known Philadelphia tire makers, James L. Gibney & Bro., located at 248-252 West Fifty-fourth street, New York City

STEWART OFFERS NEW SPEEDOMETER

The Stewart & Clark Mfg. Co., makers of the Stewart Speedometer, are now marketing a new type of speedometer, known as the "Stewart Special."

The illustration will make clear the design and function of the component parts. Multipolar induction is the actuating principle. AA is the containing cup or casing, one-piece drawn brass. U is the frame on which the parts are assembled. This frame is machined with integral sockets, bosses, shoulders, etc. B is the generator or rotor. It consists of a ring of nonferrous material, on which are mounted two permanent magnets CC, CC, of the closed-ring type, divided by an insulating plate. These magnets are accurately machined from imported tungsten steel, made to special analysis, the highest priced material obtainable from this purpose. They are hardened in a special furnace of our own design, are magnetized, aged and tested before assembling in the rotor. D is the spindle to which attaches the flexible shaft from the road-wheel connection. Formed integrally on the upper end of this shaft is the bevel pinion E, which revolves the rotor R through the medium of the internal bevel gear F. The central stud G on which the rotor B revolves is recessed to receive the cap and crown jewel bearing H. Stepped in this bearing is the tempered and highly polished pin I, secured to this pin is the disc JJ. This disc is made of an alloy metal, having a low resistance and is exceedingly light. The fixed plate KK serves as a support for the jewel guide L and one end of the restraining spring M, the other end of this spring being secured to the pin shaft I. To the upper end of the pin I is secured the indicating pointer N, which moves over the graduated scale OO. RR is the revolving field. TT is the rotor bearing of which F bevel gear is an integral part. Interposed between the plate KK and the dial scale OO is the odometer mechanism, of which PP is the lower plate. This odometer is driven from the spindle D by means of a hardened steel gear train, S being the drive connection.

Operation.—In operation, as the rotor is revolved, lines of force flowing from the magnets CC, CC through the disc JJ cause it to revolve in the same direction as the rotor. This tendency to revolve is resisted by the spring M and is exactly proportionate to the speed at which the rotor is revolved. By reason of this arrangement of the magnets a continuous torque or drag on the disc is maintained, insuring a steady, even movement to the indicating means. This feature is of the utmost importance and because of the exceedingly few inertia of the disc makes the indicator responsive to the minutest change in speed.

Stewart Special Speedometer

KELLOGG MOTOR-DRIVEN PUMP

This pump is mounted on a heavy oak plank, which in turn is supported by substantial steel casters, so that it can be moved about. This pump entirely dispenses with the need of an air tank. The motor is of the Westinghouse make of ¼ horsepower, for either direct or alternating current. It is attached to the pump by means of chain and sprocket. The pump is of four-cylinder 1-inch stroke, 1½-inch bore, the engine base and crank case are of aluminum with the cylinder made of bronze, the pistons are leather and steel and are tested out for half a day at 500 r.p.m.

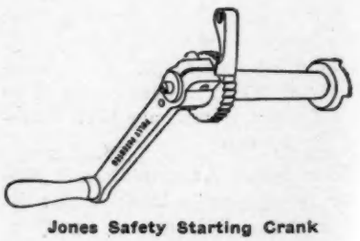
The company has tried in every way to burn down one of these leather washers, but has never been able to do so, and they fully guarantee them to stand up.

The cams are arranged on a quadrant in such a manner that one cylinder is always working. The pumps are all tested to 200 pounds and are guaranteed to deliver 120 pounds to the tire.

Kellogg electric motor-driven pump for use in private and public garages

SIMPLE SAFETY STARTING CRANK

The illustration here presented of the Jones Safety Crank suggests simplicity, and the fact that there are but a few really sturdy parts in the makeup of this device should attract the notice of discriminating buyers. It will be observed that the safety crank is not keyed or fastened to the extension of the crankshaft as in ordinary cases. In this construction the end of the crank is split, and a clamping bolt, when it is fetched up, holds the jaws in tight relation with the bearing portion of the crank extension. The friction thus induced is sufficient to permit of cranking the motor. A steel pawl, which is fastened to the cross bar at the front end of the chassis frame, engages the teeth of a ratchet wheel, which is arranged to permit of cranking to the right in the process of starting the motor, but backward motion is snubbed by the pawl and ratchet and the autoist in the process of cranking the motor is thereby protected.



Jones Safety Starting Crank